HEALTH BUILDING NOTE 40

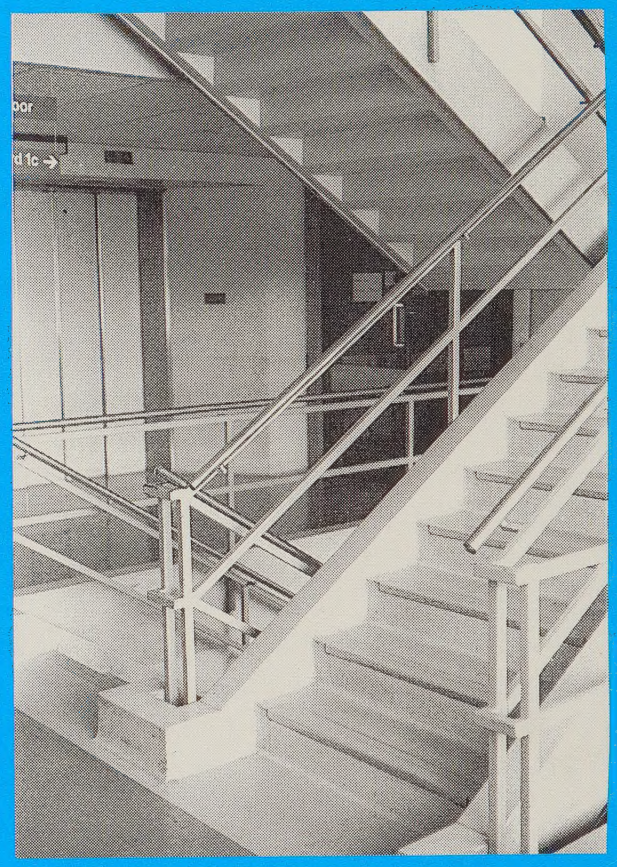
MCO 149

Common Activity Spaces

VOLUME 3

Lifts and Stairways

DEPARTMENT OF HEALTH
WELSH OFFICE



Health Building Notes

Preface
Health Building Notes (HBN) are guides for those responsible for the briefing and design stages of schemes for providing new, or adapting or extending existing health buildings. Alternative solutions and their cost implications are discussed where appropriate. Departmental Cost Allowances are based on the standards described in each HBN.

The first three HBNs in the series provide a general review of the planning of health buildings, and should be read by all those who are new to the subject:

HBN 'Buildings for the Health Service' describes the planning, construction and commissioning of a health building, and introduces the reader to Departmental publications on all aspects of building.

HBN2 'The Whole Hospital' (in preparation) describes the preparation of a brief for a health building and explains how the stages of the process may be related to the mandatory requirements of Capricode.

HBN3 'The Design of the Hospital' (in preparation) deals with the preparation of the Development Control Plan (DCP) – the 'master plan' for the hospital.

Subsequent HBNs in the series deal with individual departments and in each Note the functions, activities, equipment, environmental conditions, engineering services and dimensions which are critical to the efficient performance of an activity are identified and discussed. In these Notes it is assumed that the reader is broadly familar with the introductory volumes.

Guidance on spaces common to all health buildings is presented in the four volumes which comprise HBN40 'Common Activity Spaces'.

HBNs are usually published with a companion Design Briefing System Notebook which considerably facilitates the project team's task of translating the guidance in the related Note into a brief for designers. The value, purpose and structure of Design Briefing System Notebooks are described in DBS1 'An Aid to Briefing'.

HBNs are prepared in consultation with representatives of the National Health Service and appropriate professional bodies.

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Common Activity Spaces HBN 40 Volume 3:
Lifts and Stairways

Contents

		Page
Preface		Inside front cover
1 Scope of Health Building Note		
1.1	Introduction	3
1.6	Exclusions	3
1.8	Ergonomic data	3
1.9	Cost allowances	3
1.10	Capricode	3
1.11	Works Guidance Index	3
2 General Functional and Design Requirements		
2.1	Description of terms used: Communication/Circulation	4
2.2	Lifts	4
2.3	Economy	4
2.16	Signposting	5
2.17	Fire Precautions	5
2.22	Statutes and guidance specific to disabled people	5
2.24	Statutory and other requirements	5
2.26	Stairways	6
2.27	Design and environmental considerations	6
2.33	Finishes	6
2.36	Cleaning and maintenance	6
2.37	Damage	6
2.40	Flooring	6
3 Engineering Services		
3.1	Vertically routed engineering services	8
3.4	Safety	8
3.8	Noise	8
3.9	Heating	8
3.12	Ventilation	8
3.15	Electrical installation	9
3.20	Lighting	9
3.25	Emergency electricity supplies and lighting	9
4 Lifts		
4.1	Definition and selection	11
4.4	Hydraulic lifts	11
4.7	Fire fighting/escape bed lifts	11
4.8	Lift controls	11
4.10	Lighting of lifts	12
4.13	Vision panelling	12
Appendices		
1	Fire Precautions	13
2	Ergonomic Data	15
Figures		
1	Handrail (wall mounted)	17
2	Lift Controls	18
3	Lift – Wheelchair/Passenger 630 Kg, 1,110 × 1,400 mm	19
4	Lift – Wheelchair/Passenger 1,000 Kg, 1,600 × 1,400 mm	20
5	Lift – Stretcher/Trolley 1,000 Kg, 1,100 × 2,100 mm	21
6	Bed Lift 1,600 Kg, 1,400 × 2,400 mm	22
7	Notes for Figure 6	23
8	Bed Lift 1,800 Kg, 1,600 × 2,400 mm	24
9	Notes for Figure 8	25
10	Bed Lift 2,000 Kg, 1,500 × 2,700 mm	26
11	Notes for Figure 10	27
12	Bed Lift 2,500 Kg, 1,800 × 2,700 mm	28
13	Notes for Figure 12	29
14	Ramp	30
15	Dropped Kerb	31
16	Staircase straight flights and approach corridors	32
17	Staircase-landings: mattress evacuation	33
18	Internal stairways	34
19–26	Service Ducts (8 Data sheets)	35–42
27	Notes for Figure 26	43
References		44
Index of Subject Headings		46

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1 Scope of Health Building Note

Introduction

1.1 This document is one of four volumes of the Health Building Note (HBN) No 40 'Common Activity Spaces' providing guidance on activity spaces which frequently occur in common form in health buildings. Volume 1 gives detailed ergonomic data on a variety of clinical, sanitary and administrative spaces and is related to information in Activity Data Sheets specifically prepared to complement that volume.

1.2 Volume 2 deals with horizontal hospital circulation and communication spaces (ie corridors and ramps) and provides guidance on the planning and design of traffic routes both within and between hospital departments with particular emphasis upon the space requirements for the movement of people, goods and equipment.

1.3 This volume, volume 3, covers vertical hospital circulation and communication spaces (ie lifts and stairways) and provides complementary guidance to that in volume 2. It also deals with the engineering considerations for the installation of lifts for hospital bedsteads, passengers and goods.

1.4 Volume 4, issued simultaneously with volume 3, incorporates a collection of ergonomic drawings compiled by the Department's Ergonomic Studies Group. These draw together all available guidance and ergonomic information on designing for disabled people in health buildings providing medical care and for certain local authority social services buildings.

1.5 The planning and design of vertical hospital communications spaces will form part of a whole hospital project. There is no direct cost allowance applicable to the spaces covered in this document because this is allowed for in a project as part of the "Communications On-Costs".

Exclusions

1.6 Detailed guidance is not provided for escalators as these are not normally installed in a health building. Guidance on lifts is limited to those serving low rise buildings.

1.7 Guidance is not provided for plant rooms or other large engineering spaces; for information about access and accommodation for engineering services, reference should be made to Hospital Technical Memorandum (HTM) 23.[1]

Ergonomic Data (see Appendix 2)

1.8 Ergonomic Data Sheets are the results of analytical studies involving observations of user's requirements, published literature, British Standards and mock-up arrangements, some carried out in existing health buildings. The recorded data are presented on Ergonomic Data Sheets serving the particular needs of each Building Note. The information consists of diagrammatic layouts of situations, activities and equipment considered critical in terms of space, sequence of activity and access to and use of equipment and furniture. The Sheets are dimensioned to illustrate alternative limitations of use and carry descriptions of activities and conditions relevant to the most effective functioning in the space defined on each Sheet.

Cost Allowances

1.9 As this document gives guidance on activity spaces that occur in all health building projects it does not attract a separate cost allowance.

Capricode

1.10 Capricode is the mandatory procedural framework governing the inception, planning, processing and control of individual health building schemes. The aim of Capricode is to promote a consistent and streamlined approach to capital development that achieves best use of resources through the selection and construction of relevant and cost effective schemes that open on time and within budget. It identifies the main procedural activities and provides a framework for delegation with effective management and the proper accounting for expenditure and performance. (See 'Capricode Health Building Procedures' issued to Health Authorities with HN(86)32 in October 1986.[2])

Works Guidance Index

1.11 Whilst this Note provides guidance that is current at the time of publication, it must be borne in mind that there are wider considerations associated with medical gases, high risk infectious diseases, fire, energy conservation etc. covered by other published guidance which must also be taken into account. Additionally, some aspects of the guidance in this Note may from time to time be amended or qualified and it is necessary for project teams to check with the current edition of the Works Guidance Index. The Index is published by the Department in May each year and updated in September and January. It should be noted that as the Index covers the guidance current in the previous year it carries the previous year's date.

2 General Functional and Design Requirements

Description of terms used

2.1 There are two main requirements for the common activity spaces dealt with in this Note: communications which link together individual departments and circulation space which links together rooms within departments. These are defined for costing purposes in Capricode as:

a. *Communications*
Space and/or main engineering services between departments for movement of people, supplies and services (including lifts, stairs and main ducts or shafts).

b. *Circulation Space*
Space within a department for movement of people and supplies (also includes space occupied by internal partitions).

2.2 The following terms used in this Note are defined thus:

a. *Lifts*

i. *Wheelchair/Passenger Lift*. A lift whose car dimensions and construction permits the access of a standard Department of Health wheelchair, with attendant if necessary, or passengers.

ii. *Trolley/Passenger Lift*. A lift whose car dimensions and construction permit the access of a trolley with occupant and attendants, or passengers.

iii. *Bed-passenger Lift*. A lift whose car dimensions and construction permit the access of hospital beds, or patient trollies, attendants and/or passengers.

iv. *Escape Bed Lift*. A bed passenger lift protected in accordance with Fire Practice Note (FPN) 3[3] to enable it to be used to safely transport dependant patients to the ground storey in the event of fire.

v *Traction-driven Lift (electric)*. A lift whose lifting ropes are driven by friction in the grooves of the driving sheave of the machine.

vi. *Hydraulic Lift*. A lift whose driving power is transmitted by means of a fluid.

vii. *Goods Lift*. A lift whose car permits the carriage of general goods and passengers.

viii. *Service Lift*. A lift whose car interior is inaccessible to persons.

ix. *Well*. The space bounded by the bottom of the pit, the walls and the roof of the space in which the lift car (and counterweights, if provided) travel.

x. *Machine Room*. A room in which the lift driving machinery and associated equipment are placed.

b. *Stairways*
A description of all the terms used in connection with a stairway can be found in the British Standard (BS) 5578: Part 1:1978.[4] The specification for co-ordinating dimensions for stairs and stair openings appear in BS 5578 Part 2.[5]

Economy

2.3 Spaces for communications and circulation are a functional necessity. They should be provided as economically as is practicable, while ensuring that their functional requirements are met. It should be remembered that excessive provision can have an adverse effect on other more important parts of the scheme.

2.4 Lifts and stairways should be located to deal effectively with the anticipated traffic patterns of staff, patients, visitors and their associated activities.

2.5 The prime considerations governing the location and number of stairways in new hospitals are the fire safety requirements set out in HTM 81.[6] Additionally, there may be instances where the location and number of stairs are further influenced by the location and number of lifts and by the volume and pattern of traffic of patients and staff.

2.6 Traffic planning guidance for lift installations intended for low-rise buildings is not readily available. The BS Code of Practice for the Selection and Installation of Lifts (BS 5655: Part 6)[7] provides performance data and calculations for lifts to serve buildings of 6–18 floors. In practice, for a modern 300-bed hospital built substantially on two floors, the minimum number of bed-passenger lifts could not be less than two, but the configuration of a particular building would affect the solution adopted.

2.7 In low-rise buildings (ie 5 floors or less), hydraulic lifts offer attractive alternatives to electric traction lifts (see Chapter 4).

2.8 In the smaller and usually self-contained health buildings which are built on two or more floors, the provision and size of a lift will usually be determined by any overriding need to transport vertically a disabled or wheelchair patient together with a person in attendance rather than by traffic considerations. Because a lift would involve a significant proportion of the capital and revenue costs of this type of premises, planning solutions to avoid the need for a lift should always be sought in the first instance.

2.9 King's Fund Beds are the standard bedsteads recommended for hospital use. The dimensions of these bedsteads have been used as the basis for setting the dimensions for lifts. If other bedsteads are considered, their dimensions must be compared with those of the

King's Fund Beds. Bedsteads having greater dimensions will require increased allowances for space and may introduce access and accommodation difficulties for bed-passenger lifts.

2.10 The provision of panoramic lifts is not considered in this Note. These expensive lifts are purely passenger lifts and could not be justified in a hospital.

2.11 The provision of escalators are not considered in this Note. They are rarely used in hospitals as they have significant disadvantages in space consumption and requirements for fire compartmentation. Their economic justification is difficult because bed-passenger lifts, stairways, ramps etc would be required in addition. The safety and design requirements for escalators are set out in BS 5656: 1983.[8]

2.12 The need to provide bed-passenger lifts as escape bed lifts should be considered (see paragraph 4.7).

2.13 The layout of a two-storey hospital should make it unnecessary to provide a goods lift. Departments requiring to move heavy or substantial loads of goods should be suitably located to avoid the need for a goods lift. The infrequent replacement of plant and equipment in high level plant rooms would be expected to be achieved by the use of either a mobile crane or an external lifting beam and hoist.

2.14 A service lift may sometimes be required if frequent vertical transportation between floor levels is an essential feature of the activity of a department.

2.15 Landings and surrounds for lifts require correct space allocations. The minimum vertical distance between two successive landings to accommodate landing door assemblies is given in BS 5655: Part 5, Table 1.[9] The depths of landings for lifts are set by Table 9 of BS 5655: Part 5,[9] but the landing areas quoted do not take account of any additional through traffic not directly associated with use of the lifts. Circulation space requirements for hospital bedsteads and wheelchairs are covered by 'Common Activity Spaces', HBN 40 Volume 2[10] and the Ergonomic Data Sheets (See Appendix 2).

Signposting

2.16 General information regarding signposting is given in HBN 40 'Common Activity Spaces' Volume 2 [10] and HTM 65 'Signs'.[11]

Fire Precautions

2.17 Fire precautions apply to new buildings as well as to existing buildings which are altered or upgraded. It is particularly important at the earliest planning stage to consider in relation to the whole accommodation:

a. structural fire precautions;
b. alarm and detection systems;
c. means of escape and access for fire fighting;
d. fire fighting equipment.

2.18 Fire precaution requirements will generally affect (sometimes radically) the architect's design and the engineers systems. Both should discuss and verify their proposals with the Local Fire Authority (or Home Office in the case of offices, shops and factories, since these premises may need a fire certificate).

2.19 It is essential that all health service designers, whether in-house or consultants, implement all statutes and all guidance on the fire precautions relevant to the premises being designed. Guidance issued by the Department of Health, and Department of the Environment and the Home Office is listed in Appendix 1. This guidance is revised or re-issued from time to time. Legislation is altered, amended, repealed etc. The currency of all documents must therefore be checked at the time of design.

2.20 Certain mixed occupancies may necessitate the application of more than one statute and more than one guidance document.

2.21 Project teams and all other staff need to be made aware of the fire strategy for the design, in terms of staff responsibilities, together with the specific measures designed into the building and into the surrounding external works.

Statutes and Guidance Specific to Disabled People

2.22 Health Authorities are reminded of the need to comply with the Chronically Sick and Disabled Persons Act 1970[12] as amended by the Chronically Sick and Disabled Persons Act 1976[13], the Disabled Person's Act 1981[14] and the Building (Disabled People) Regulations 1987,[15] Practical design guidance is contained in the following:

Department of the Environment (DOE) Approved Document M: Access for the Disabled[16]
BS 5810: Access for the Disabled to Buildings[17]
BS 4619: Code of Practice for the Design of Housing for the Convenience of Disabled People[18]

2.23 Reference should also be made to 'Common Activity Spaces' HBN 40, volume 4[19] which gives specific guidance on designing for disabled people.

Statutory and Other Requirements

2.24 Health Circular HC(88)60/HC(FP)(88)29[78], issued in December 1988, advises health authorities that their building schemes should comply with the requirements of building legislation, even where these are not legally enforceable against authorities, and with all other relevant codes of practice standards. It also requires authorities to ensure they have adequate procedures to ensure compliance. Attention is also drawn to HC(86)14[20] concerning Food Hygiene and Pest Control in the Health Service, and HC(87)3[21] concerning Health and Safety at Work: Crown Immunity. These give the practical implications of the change in the law on Crown Immunity. This Note takes account as far as possible of all statutory and other requirements currently in force but health authorities are reminded of their responsibility for ensuring compliance with statutes, regulations, codes and standards.

2.25 This Note contains data limited to ergonomic requirements for movement of hospital patients and equipment. However where the Statute, Approved Documents, British Standards, HTMs etc give additional requirements, eg larger dimensions, these should be complied with. Health authorities are reminded of their responsibility for

obtaining fire certificates for the designated parts of health buildings.

Stairways

2.26 The general design, lighting and surface finishing for stairs and lift lobbies contribute to the overall impression gained of the hospital environment and should be carefully co-ordinated with those selected for the various departments and their horizontal communications. The decor and finishes (see paragraph 2.33) in the lift lobbies and stairways should be of equal standard to those throughout the hospital. The design of all balustrading must be to the recommended spacing of members to ensure the safety of children.

Design and Environmental Considerations

2.27 All hospital stairways should be designed as escape stairways in accordance with HTM 81.[6]

2.28 It is essential that the location and inter-relationship of all modes of vertical transportation are settled early in the planning stage with sufficient allocation of space. Machine room and machinery spaces should not be overlooked.

2.29 It will be necessary to offer alternative modes of vertical communication and to locate these nearby so that at times of peak demand, breakdown or emergency, ease of transfer between them is possible. Approved Documents B2/3/4 of the Building Regulations 1985[22] allow stairways and lifts to be located within the same protected shaft.

2.30 The close association of lifts and stairways encourage potential passengers to use the alternatives, thereby reducing waiting time and overcoming objections. Escape Bed lifts should be sited remotely from all other lifts and stairways (see HTM 81[6] and FPN 3[3]).

2.31 The detailed design of stairways needs to take into account the main function, which is the safe evacuation of patients, some walking, some carried on mattresses. Provision also must be made in the design to provide space for the Fire Brigade to ascend the stairway while evacuation is in progress, and for day-to-day usage which may be considerable, particularly in low rise buildings.

2.32 Detailed dimensions of width and depth for passing and turning in the condition of evacuation in the case of emergency, are stated in Firecode HTM 81 – Fire Precautions in New Hospitals.[6] Dimensions of steps, for mattress drawn patient evacuation areas in new hospitals are "going 280 mm" and "rise 170 mm". Approved Documents K[23] and Mandatory Rules for Means of Escape in Case of Fire of the Building Regulations 1985[24] should also be consulted. Open risers and splayed steps should be avoided.

Finishes

2.33 Project teams should collaborate with interior designers from the outset of the design stage in the selection of appropriate finishes and the overall design, and with domestic services advisers as to suitability for cleaning and maintenance.

2.34 In many low rise hospitals, stairways will be used quite extensively for everyday traffic, mainly by staff but also the more mobile patients. Decor inside the stairways should be fully considered with a view to providing a pleasant, safe (particularly for children) and efficient space. It is important that the finishes used should comply with Approved Document B2/3/4[22] for surface spread of flame requirements (class '0' for circulation spaces and protected shafts) and to contribute to an overall environment which is satisfactory. Colour schemes should be carried through from adjoining spaces. Floor finishes should not be too hard, in order to minimise noise. For safety reasons, all stairways should be surfaced with non-slip finishes.

2.35 Guidance on categories of performance of finishes for walls is available in HTM 56 – Partitions.[25]

Cleaning and maintenance

2.36 General advice on cleaning and maintenance contained in HBN 40 'Common Activity Space' Volume 2 (paragraphs 60–67)[10] is applicable to lifts and stairs. Some aspects eg spillages, graffiti and particularly access to windows may present special problems in staircases. Graffiti in public places is an increasing problem; the provision of finishes which will allow its easy removal could significantly reduce cleaning costs. Textured finishes can present cleaning and maintenance problems and designers should consult with domestic services advisers in their selection.

Damage

2.37 Stairways are less exposed to damage then corridors and lobbies. Apart from any graffiti on walls and ceilings, damage will probably result mainly from failure of materials and finishes lacking the necessary durability.

2.38 The most likely failure is the gradual deterioration of protective strips to the edges of steps and also lack of strength in balustrades and their anchorage resulting often in wobbliness and movement giving a feeling of insecurity (see Approved Document K).[23]

2.39 Damage to lift-doors and to the walls of lift cars is usually caused by trolley impact. Consideration therefore should be given to the necessary durability of the materials and finishes selected for cladding the internal walls of the lift cars. The cost implications of construction, finish and protection as well as problems of possible periodical renewal must be fully considered, bearing in mind the long term affects of decisions made at design stage, affecting both capital and running costs.

Flooring

2.40 It is important to select a floor covering which contributes towards the creation of an attractive environment, but which does not present a hazard to disabled people or the movement of wheeled equipment. It is important that whatever floor covering is chosen can be effectively cleaned, maintained and, where necessary, repaired. Rapid developments in soft floor covering technology have produced a wide variety of new materials. (See report of the Floor Covering Study Group issued to Health Authorities with HM(78)32 – WHN(78)92 in Wales[26] –

HTM 61 – 'Flooring'.[27]) Floors should not present or appear to present a slip hazard and the patterning should not produce disorientation. Surface drag, flammability, and infection hazards are other factors which need to be considered.

3 Engineering Services

Vertically Routed Engineering Services

3.1 The engineering services for health care buildings can be complex and need to be integrated successfully within the building fabric.

3.2 Vertical engineering services will usually be accommodated in special builders-work ducts or shafts which are generally kept quite separate from pedestrian communication/circulation routes, unlike the practice for horizontally routed services (see 'Engineering' Section of HBN 40 'Common Activity Spaces' Volume 2[10]). The optimum locations for vertical services ducts will be arranged to meet the requirements of engineering design and cost effectiveness. HTM 23[1] gives more specific guidance for the accommodation of engineering services in vertical ducts.

3.3 Lift wells must not be used as general vertical services routes. They should contain only those services directly associated with, and forming part of, the lift installation.

Safety

3.4 Section 6 of the Health and Safety at Work Act 1974,[28] as amended by schedule 3 of the Consumer Protection Act 1987[29] imposes statutory duties on all persons who design, manufacture, import, supply, install or erect "articles for use at work". One of the requirements of this section is to ensure, so far as is reasonably practicable, that the article is so designed and constructed that it will be safe and without risks to health at all times when it is being set, used, cleaned or maintained by a person at work. All parts of engineering systems are covered by the term "articles for use at work" and designers of these systems for health care premises must therefore fulfil their statutory obligations.

3.5 Design guidance relative to the fire safety requirements in new hospitals, including specific references to escape routes, protected ducts or vertical shafts and other enclosures for engineering services is given in HTM 81.[6] Technical information concerning the design and specification of fire detection and alarm systems is detailed in HTM 82[30] which also replaces or modifies certain clauses of BS 5839 Part 1[31] to meet the needs of health care premises. More general advice on fire protection and training requirements is given in HTM 83.[32]

3.6 The design of the engineering services should accord with the recommendations in the above series of HTMs and the engineer should verify his proposals in accordance with the procedure described in paragraph 2.17–2.21.

3.7 In order to minimise inconvenience to patients and staff when maintenance procedures are being undertaken, the engineering sub-distribution and control centres eg electrical distribution, will generally be located so that access may easily be gained from corridors and circulation spaces. All engineering equipment requiring maintenance from floor-level access should be accommodated in suitably secure rooms or cupboards to protect the equipment and to prevent unauthorised access.

Noise

3.8 Excessive noise in communication and circulation spaces, whether internally or externally generated and transmitted, is disturbing and can adversely affect the operational efficiency of hospital departments. The limits and means of control advocated in Hospital Design Note 4,[33] including its revision, HN(76)126,[34] and Engineering Data Sheet DH 1.2[35] should provide an acceptable acoustic environment. The engineering services should be designed to enable noise levels below 65dB(A) to be achieved in circulation areas having regard to all other noise sources affecting the area.

Heating

3.9 The recommended temperature to be maintained by the heating systems is as follows:

a. in vertical communicating routes directly connected with the hospital street 18°C.

b. in local departmental vertical circulation spaces – as for the associated department.

c. in any other vertical circulation spaces the temperature will depend on the main user as follows:

in spaces used by patients	18°C
in spaces used by staff	16°C
in spaces used for goods delivery	10°C

3.10 When determining heat loss the infiltration of air should be taken as $1\frac{1}{2}$ air changes per hour for any circulation spaces on or connected to the perimeter of the building. Depending upon their relative volumes, a higher rate of infiltration may be necessary in perimeter stairways serving intensively used, enclosed, internal areas where mechanical extract systems induce air movement for ventilation and odour control.

3.11 The installation of heat emitters and associated pipework should not cause any impediment to passing traffic and neither should they reduce the minimum clear width of stairways and landings as exemplified in Section VI of 'Common Activity Spaces' HBN 40, Volume 2: Corridors.[10]

Ventilation

3.12 The fenestration of perimeter stairways provides an important contribution to the natural lighting and ventilation of health care premises. Seasonal control of infiltration requires opening lights that are fully adjustable

between maximum and minimum to provide optimum air movement without prejudicing safety, security or comfort, and which are draught-free when closed.

3.13 Specific guidance on lift shafts and stairways ventilation is given in Approved Document B2/3/4,[22] Mandatory Rules for Means of Escape in Cases of Fire,[24] Approved Document F,[36] Fire Practice Notice 3[3] and HTM 81.[6]

3.14 Where totally enclosed stairways serve enclosed, internal mechanically ventilated accommodation, a supply air system will be required with sufficient volume to ensure that the stairway is maintained at a positive pressure. In departments open only during the daytime (ie "9 to 5 departments"), consideration should be given to the extended running of "dirty" extract systems under time-switch control to ensure adequate purging.

Electrical installation

3.15 The electrical installation will comprise switchgear, wiring and equipment for lighting and power and may include power supplies for environmental plant and controls. Installations should comply with the current edition of the IEE Regulations for Electrical Installations[37], with HTM 7[38] and HTM 11.[39] Extensions from the hospital central system for telephones, fire alarms and communications systems will also be required.

3.16 Normal (ie "non-essential") power supplies should be available from switchboards serving departments adjacent to vertical circulating spaces. "Essential" circuits supplying, amongst other things, lighting used for stairways and escape routes must be separately routed to maintain the integrity of lighting in times of emergency (see also 3.20). Essential power supplies should be available from the nearest convenient essential switchboard. Distribution centres will also contain power supplies and controls for communication and alarm systems and adequate space will be required for access and maintenance.

3.17 Precautions are required to ensure that electrical installations and installed equipment, eg luminaires and lift motors controllers, are not a source of radio-frequency radiation or power system transients which could adversely affect electro-medical equipment in adjacent departments. Guidance concerning the avoidance and abatement of electrical interference is given in HTM 14.[40]

3.18 The electrical installation in occupied areas should be concealed usually using PVC insulated cable in screwed steel conduit or trunking but, in certain circumstances, mineral insulated copper covered cables may be necessary. External installations, or any part within the building subject to external conditions eg roofed open stairways, should comprise PVC insulated cables in galvanised screwed steel conduit with fittings of weatherproof pattern. Steel conduit and trunking for communications systems should be concealed whenever possible.

3.19 Domestic cleaning appliances having flexible leads nine metres long should be assumed and suitably located 13 amp switched socket outlets with shutters should be provided to enable such machines to operate over the whole range of the stairways and circulation spaces concerned.

Lighting

3.20 For safety reasons, all stairways and lift landings should be correctly illuminated. The creation of a building form which permits daylight to enter stairways is one way of providing an interesting environment. The electric lighting should emphasise shape, colour and texture, with particular care and thought given to the areas where no daylight can reach.

3.21 The selection and location of luminaires can make a major contribution to the creation of a non-institutional environment in stairways and circulation spaces. The use of colour finishes, graphics and lighting should be co-ordinated to establish a calm and welcoming atmosphere whilst contributing to the safe movement of traffic. Practical methods of lighting the various functional spaces are contained in the CIBSE Lighting Guide.[41] The choice of luminaires should take account not only of the requirements of light distribution and visual comfort appropriate to the space, but also the operating efficiency of the light source used. Luminaires should be of types which are easily cleaned and maintained and are manufactured and tested in accordance with the requirements specified in the relevant sections of BS4533.[42] Luminaires using fluorescent lamps should be installed when aritifical lighting is required for long periods or where areas are devoid of natural light; intermittently used luminaires may be fitted with incandescent or compact fluorescent lamps.

3.22 The use of ceiling mounted, surface or recessed luminaires which provide directional lighting for interesting wall surfaces will aid the creation of a pleasant environment for stairs. Stairs lighting should be reasonably uniform. Luminaires should be located to avoid glare to people descending the stairways. The nosings of the stair treads should be defined and the vertical risers should be in partial shadow.

3.23 Control of lighting is normally by local switches and these should be provided in sufficient numbers to allow variation in lighting intensity, eg reduced levels of illumination at night when security permits, and to encourage energy conservation. This is particularly relevant where sections of a stairway may have natural light, eg from entrances or courtyards, whilst the remainder is enclosed internally.

3.24 Direction signs should be illuminated by the general lighting so that they are clearly legible without being masked by reflections or glare from nearby luminaires or windows. Internal lighting of direction and location signs is usually reserved for signs of major importance which need to have a strong visual impact, eg Exit signs.

Emergency electricity supplies and lighting

3.25 Every staircase should have approximately half the luminaires connected to essential circuits supplied by the standby generator in the event of interruption of the normal supply. Any stairway in any hospital building which forms part of the escape route must be provided with safety lighting supplied by "essential" circuits. To guard against failure alternate luminaires providing safety lighting should be connected to one of two "essential" circuits reserved for safety lighting. A short break in supply of about 15 seconds will occur during the period that the

engine is run-up to its operating speed. For specific stairways where this break is considered unacceptable or where essential circuits supplies by automatic start standby generator are not available, battery operated luminaires should be mounted in strategic positions. Guidance on the provision of emergency electricity supplies is given in HTM 11.[39] Lifts should have at least one luminaire connected to an independent battery source.

4 Lifts

Definition and Selection

4.1 There are basically four classes of passenger-carrying lifts in buildings providing health care. They are wheelchair/passenger lifts, trolley/passenger lifts, bed/passenger lifts and escape bed lifts. The first two classes have small cars and are rarely (if ever) used in hospitals. The four classes are shown in the table below:

Use	*Complies with BS 5655[7] Part 5*	*Power-Operated Sliding Doors*	*Car Floor Dimensions (mm)*	*Rated Loads (kg)*
Wheelchair/passenger	Table 2		1100 × 1400	630
Wheelchair/passenger	Table 4	two-panel centre opening	1600 × 1400	1000
Trolley/passenger	Table 3	single-panel side opening	1100 × 2100	1000
Bed/Passenger	Table 6	two-panel side opening	1400 × 2400	1600
			1600 × 2400	1800
			1500 × 2700	2000
			1800 × 2700	2500
Escape Bed – see Fire Practice Note 3[3]				

Definitions are given in paragraph 2.2

4.2 *Landing Depths* All lift landing depths must comply with the minimum requirements of the Building Regulations Approved Document M2/3/4 (access for disabled people)[16] and should also conform with the recommendations provided in BS 5655 Part 5[9] (which may exceed the Building Regulations requirements (Landing Area) paragraph 5.4 and Table 9 (Landing depths).

NB. The diagrams (Fig No's 3,4,5,6,8,10, & 12) show the space requirements for moving of wheelchairs, stretcher trollies and beds (including attachments) but do not show landing depths necessary to comply with the foregoing requirements.

4.3 Selection of suitable lifts to cope with the anticipated traffic should always aim for the smallest size of the available range, particularly in the case of bed-passenger lifts. However, reference should be made to the Ergonomic Data Sheets (Appendix 2) to ensure that the required sizes of bedsteads conforming to the King's Fund standard dimensions, with attachments if necessary, may be suitably accommodated.

Hydraulic Lifts

4.4 Hydraulic lifts offer some advantages which do not appear with electric traction lifts. They have no overhead machine rooms which improves the architectural appearance at the roof-line and also provides opportunity for possible upwards development, provided the original structural design allows for increased load bearing extensions, at a later period. The machine room is also smaller and may be flexibly located up to several metres away from the lift well. Lift imposed loadings are supported from below and wells can be smaller due to the absence of counterweights. Some hydraulic jacking systems are located above pit floor level and avoid the need to sink a bore-hole in the generally shallower pits. Hydraulic lifts have quiet, smooth operation and their more accurate floor levelling is very disirable for bed-passenger lift work. Control facilities can be identical to those for traction driven lifts and maintenance is generally easier than for traction driven lifts.

4.5 At the time of writing, the general requirements for hydraulic lift systems in the UK are covered by BS 2655: Part 1,[43] as enhanced by BS 5655: Part 2 (Interim).[44] The differing typical engineering concepts for hydraulic lifts are covered by DHSS Engineering Data Sheets DJ 5.1/13.[45] It will be noted that the direct acting jack unit of 'Type 1' requires the sinking of a lined bore-hole beneath the pit.

4.6 The standards for the arrangements and sizes of hydraulic lifts are under review. Individual hydraulic lift manufacturers should be approached for detailed information for dimensions of cars, wells and machinery spaces, until a definitive British Standard is published.

Fire Fighting/Escape Bed Lifts

4.7 The fire precaution arrangements for the hospital may require the installation of fire fighting lifts or escape bed lifts (HTM 81).[6] Such lifts have specialised building and engineering requirements. Detailed guidance on fire fighting lifts is given in BS 5588: Part 5: 1986[46] and on escape bed lifts in HTM 81[6] and Fire Practice Note 3: Escape Bed Lifts.[3]

4.8 the position of the manual control devices for lift installations will usually be arranged by the lift manufacturer. However, where controls are provided for independent use by disabled people within wheelchairs these will require careful location. BS 5655: Part 7: 1983,[47] BS 5810[48] and the DHSS Ergonomic Data Sheets (Appendix 2) give guidance on positioning of controls and additional fittings such as handrails.

Lift controls

4.9 Whilst the "restricted minimum" dimensions shown in the DHSS Ergonomic Data Sheets (Appendix 2) are consistent with the British Standard recommendations relating to the location of lift controls, it should be noted that the "preferred minimum" dimensions included in the Ergonomic Data Sheets, especially those relating to the lateral location of controls within the lift car, will cater for a very wide range of spinal disabilities and these should be specified wherever practicable.

Lighting

4.10 The lighting in passenger, bed-passenger and escape bed lifts may be either direct or indirect. Direct lighting should be from surface or recessed luminaires having a low luminance. The main lighting source in any lift serving clinical areas should be derived from one of the recommended types of lamps having suitable colour rendering characteristics. In such lifts the colours chosen for the lift car walls, floor and ceiling should be carefully selected to ensure compatibility with the colour rendering properties of the lamp and that spectral distribution of the light source is not adversely affected. HN(85)20[49] describes some high efficiency fluorescent lamps with good colour rendering properties which are also suitable for this application.

4.11 The general requirements for permanent electric lighting for lift cars, lift landings, machine rooms and lift wells, including supply arrangements are covered by BS 5655: Part 1 1986.[50]

4.12 The lighting requirements for hydraulic lifts should be assumed to be the same as those given in BS 5655: Part 1[50] 1986 for electric lifts.

Vision Panelling

4.13 The conditions for providing transparent vision panels for lift landing doors and lift car doors are also covered by BS 5655: Part 1, 1986[50] where mechanical strength, thickness, size and positioning are defined.

Appendix 1 Fire Precautions

Statutory Requirements

1. All statutory requirements must be complied with. Particularly important examples are:

a. The Building Act 1984;[51]

b. The Building Regulations 1985;[52]

c. The Fire Precautions Act 1971.[53]

Guidance issued by the Department of Health

2. The Department of Health has issued guidance which is contained in FIRECODE as follows:

a. Policy and Principles;[54]

b. Directory of Fire Documents;[55]

c. Nucleus Fire Precautions Recommendations (1st Edition);[56]

d. HTM 81 Fire Precautions in New Hospitals;[6]

e. HTM 82 Fire Alarm and Detection Systems;[30]

f. HTM 83 General Fire Precautions;[32]

g. HTM 86 Assessing Fire Risks in Existing Hospital Wards;[57]

h. HTM 87 Furniture, Furnishing, Bed Assemblies, Apparel;[58]

j. HTM 88 Fire Precautions in NHS Housing in the Community for Mentally Handicapped (or Mentally Ill) People;[59]

k. Fire Practice Notes (FPNs) No's:
   1. Laundries;[60]
   2. Storage of Flammable Liquids;[61]
   3. Escape bed Lifts.[3]

3. FIRECODE will be extended by issue of the following:

a. HTM 84 Draft Fire Precautions in New Residential Care Premises;[62]

b. Fire Practice Notes (FPNs) No's:
   4. Kitchens[63]
   5. Boiler and Incinerator Rooms[64]
   6. Laboratories[65]

4. Some of the present HTM's in FIRECODE will be revised and re-issued as follows:

HTM 82	Alarm and Detection Systems;
HTM 83	General Fire Precautions;
HTM 87	Textiles and Furniture (new title);
HTM 88	Fire Precautions in Unsupervised Group Homes (new title);
Nucleus	Fire Precautions Recommendations (2nd Edition).

5. Detailed information for the selection of specific fire resisting components and fire signs are given in:

a.	HTM 56	Partitions;[25]
b.	HTM 57	Internal Glazing;[66]
c.	HTM 58	Internal Door Sets;[67]
d.	HTM 59	Ironmongery;[68]
e.	HTM 60	Ceilings;[69]
f.	HTM 65	Signs.[11]

These HTM's are not part of FIRECODE because they deal with general subjects.

6. The Department also published 'The Agreement for the Appointment of Architects, Quantity Surveyors, Structural and Service Engineers for Commissions in the NHS'.[70] This Agreement contains Design/Construction Certificates, which include conformity with Health Service Fire Standards.

Guidance issued by the Department of the Environment

7. The Department of the Environment has issued practical guidance to the Building Regulations and the following which affect various aspects of structural fire precautions, means of escape etc:

a. Approved Document B 'Fire Spread';[22]

b. Approved Document J 'Heat Producing Appliances';[71]

c. Approved Document K 'Stairways and Ramps';[23]

d. 'Mandatory Rules for Means of Escape in Case of Fire'.[24]

Guidance issued by the Home Office

8. The Home Office has issued guidance to the Fire Precautions Act 1971 as follows:

a. No 1 'Hotels and Boarding Houses';[72]

b. No 2 'Factories';[73]

c. No 3 'Offices, Shops and Railway Premises';[74]

d. 'Draft Guide to Fire Precautions in Hospitals'[75]

e. 'Draft Guide to Fire Precautions in Existing Residential Care Premises';[76]

9. The Home Office is also preparing fire guidance on the following:

a. 'Houses in Multiple Occupation';

b. 'Guide to Fire Precautions in Places of Work that require a Fire Certificate';

c. 'Code of Practice for Fire Precautions in Factories, Offices, Shops and Railway Premises not required to have a Fire Certificate'.

Checking the currency of guidance

10. Guidance issued by the Department of Health, The Department of the Environment and the Home Office is revised or re-issued from time to time. Legislation is altered, amended, repealed etc. The currency of all documents must therefore be checked at the time of the design.

11. Details of relevant legislation and guidance are held on commercially available Registers. These Registers include the actual fire precautions documents which can be viewed on accompanying microfiches. The Registers (which are updated every four months to maintain currency) are:

a. Department of Health Register of Building Legislation Design, Operation and Maintenance;[77]

b. Department of Health Register of Departmental and Advisory Documents.[77]

12. The Register at (b) above contains a numerical list of Code of Practice (CP) and British Standards (BS) dealing with 'fire'. This list updates the list printed in FIRECODE: Directory of Fire Documents. Some of these CPs/BSs are cited in statutes and/or guidance documents.

Appendix 2 Ergonomic Data

Introduction

The overall dimensions of a particular circulation space (staircase/lifts) are dependent on the type and the rate of flow of traffic that has to be accommodated. These factors are influenced by hospital size, department sizes and types, overall plan form and various policy options. Therefore it is not possible to make specific recommendations.

However, the ergonomic data gives the space requirements for the circulation of people, staircases/lifts and individual items of equipment. The application of these dimensions should allow each of the spaces to be planned to cope with its critical requirements for traffic flow, passing conditions, turning space, parking etc. It is important that these factors should be carefully assessed, so that it is appropriate for the anticipated requirements but which is not extravagant in the use of space.

Explanatory Notes and Worked Examples

Dimensions

Two types of dimension are used to define the space required to move components – ie preferred dimensions (shown in bold type) and restricted dimensions (bracketed and shown in italics).

Preferred dimensions are appropriate where a movement is frequent and/or important.

Restricted dimensions may be acceptable where the movement is infrequent, but will impose the need to exercise "considerable care to avoid damage to building fabric" and/or component during movement.

Straight movement

Notional Approach Corridor Widths

The dimensions shown between unbroken lines are the widths of corridor required to move (ie push, pull) the particular component in a straight line. Preferred dimensions are appropriate for corridors over 10 m in length where movement is frequent and/or important.

Lane widths

Lane widths are used to calculate the overall space required when two or more components pass. Two types of lane width dimensions are used:

a. Dimensions shown between one dotted and one unbroken line refer to a lane width requirement adjacent to a wall.

b. Dimensions shown between two dotted lines refer to movement bounded on both sides by other activities.

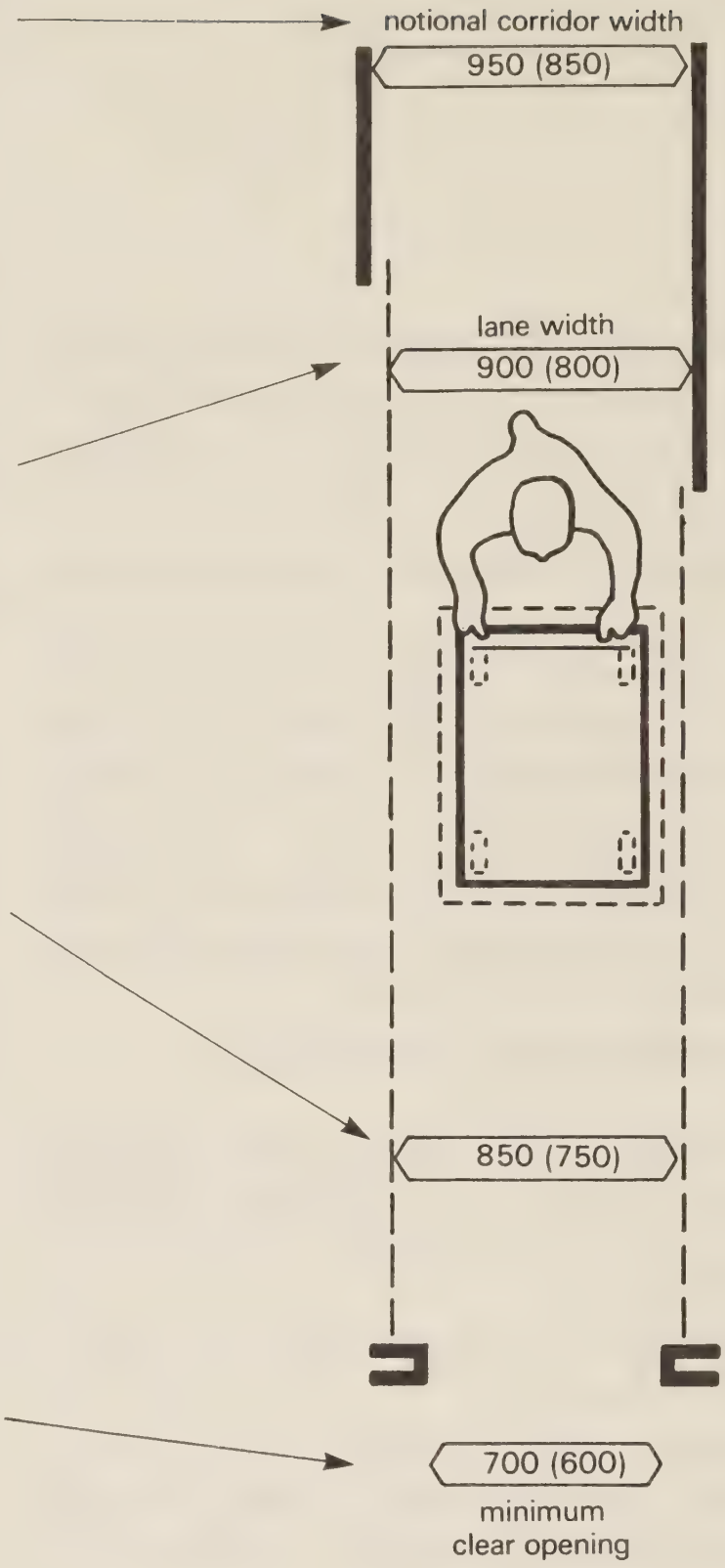
Lane widths are less than the equivalent corridor widths as they compensate for the overlapping of clearances that can occur between two passing components. Where restricted dimensions are given they refer to one component/person temporarily stopping to allow passing to occur. Therefore they are only applicable where the movement is infrequent and non-urgent.

For further details on corridor-spaces see vol 2.

Door Opening Widths To Stairs/Lifts

Passing through doors involves a shorter travel distance (1–2 m) and the dimensions given assume a reduction in speed and that greater care will be exercised.

The restricted (bracketed) widths will just allow passage through the opening to occur, but damage to building fabric and components is likely unless care is exercised.



Activities:
Walking using wall mounted handrail.

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale

Handrail

Wall mounted

Users:
Partially capable - with assistance

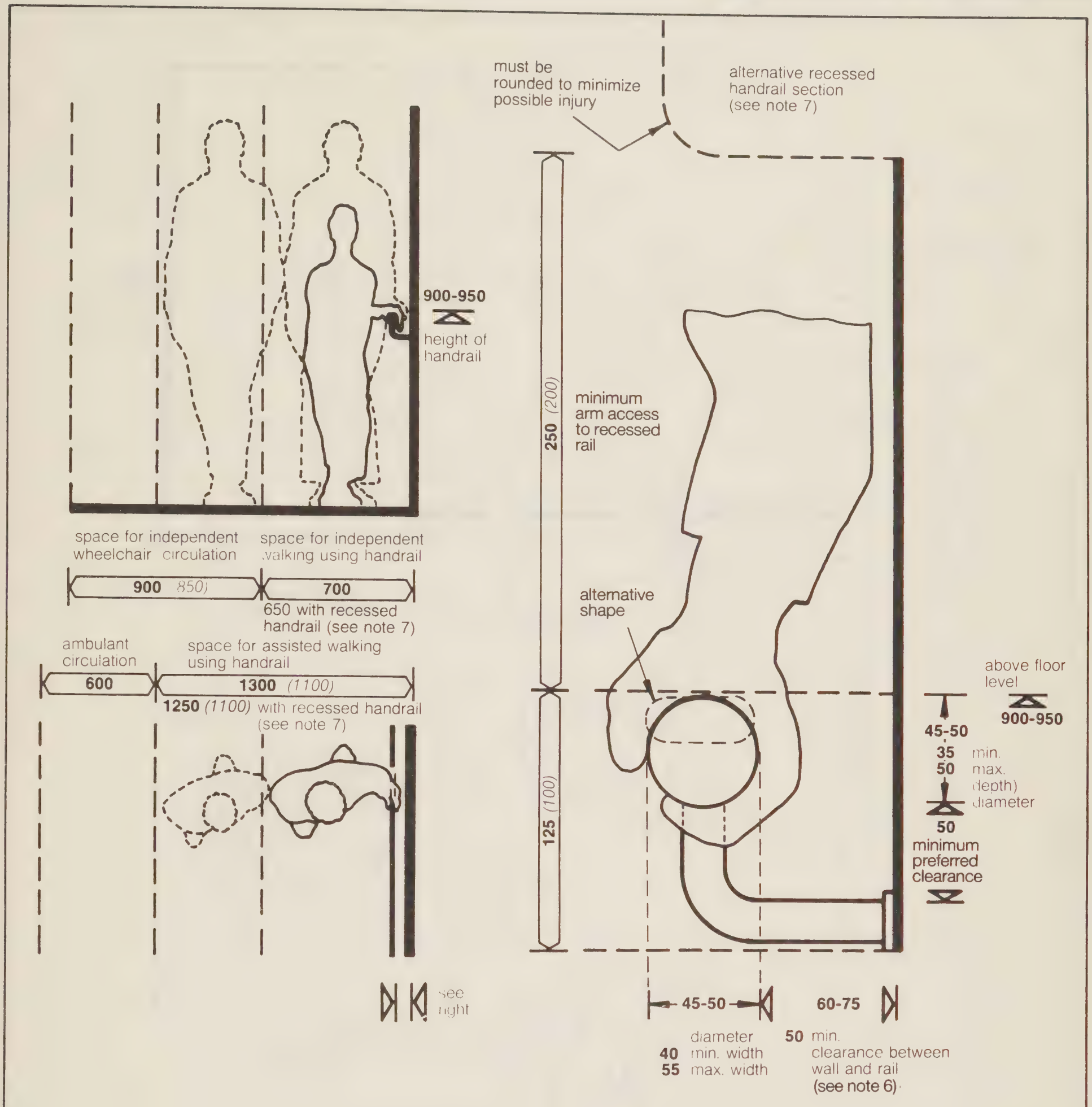


Fig.1

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes

1. Handrails must be rigid and securely fixed, and should preferably be continuous, ie not broken at landings or in lobbies. In areas of high usage they should be provided on both sides of corridors used by the old, disabled, or debilitated.

2. Handrails sections must be easy to grip. Circular sections are generally satisfactory. It should be noted that sections that are too small are uncomfortable and provide an unsatisfactory grip. Sections that are too large are difficult for people with weak or arthritic hands and therefore should be formed or grooved to allow the hand to grip the rail securely.

3. See also STAIRCASE and RAMP data sheets.

4. Adjacent floor surfaces should be slip-resistant, whether wet or dry, and changes in level should be clearly identifiable by contrasts in colour, texture and by lighting.

5. Obstructions and projections from adjacent walls should be avoided. If this is not possible they should be clearly discernible.

6. The restricted clearance space of 50mm is satisfactory for normal users but is uncomfortably tight for arthritic hands especially when gloves are worn. The larger dimension is therefore preferred and should be seen as essential in external areas and generally where outdoor clothing is worn.

7. Recessed handrail sections are not satifactory for use by the more severly disabled who prefer to 'lean' on the rail, as a comfortable position cannot be achieved.

Activities:
Access to and use of lift controls by persons in a wheelchair

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale

Lift Controls

Users:
Independent wheelchair users and ambulant disabled.

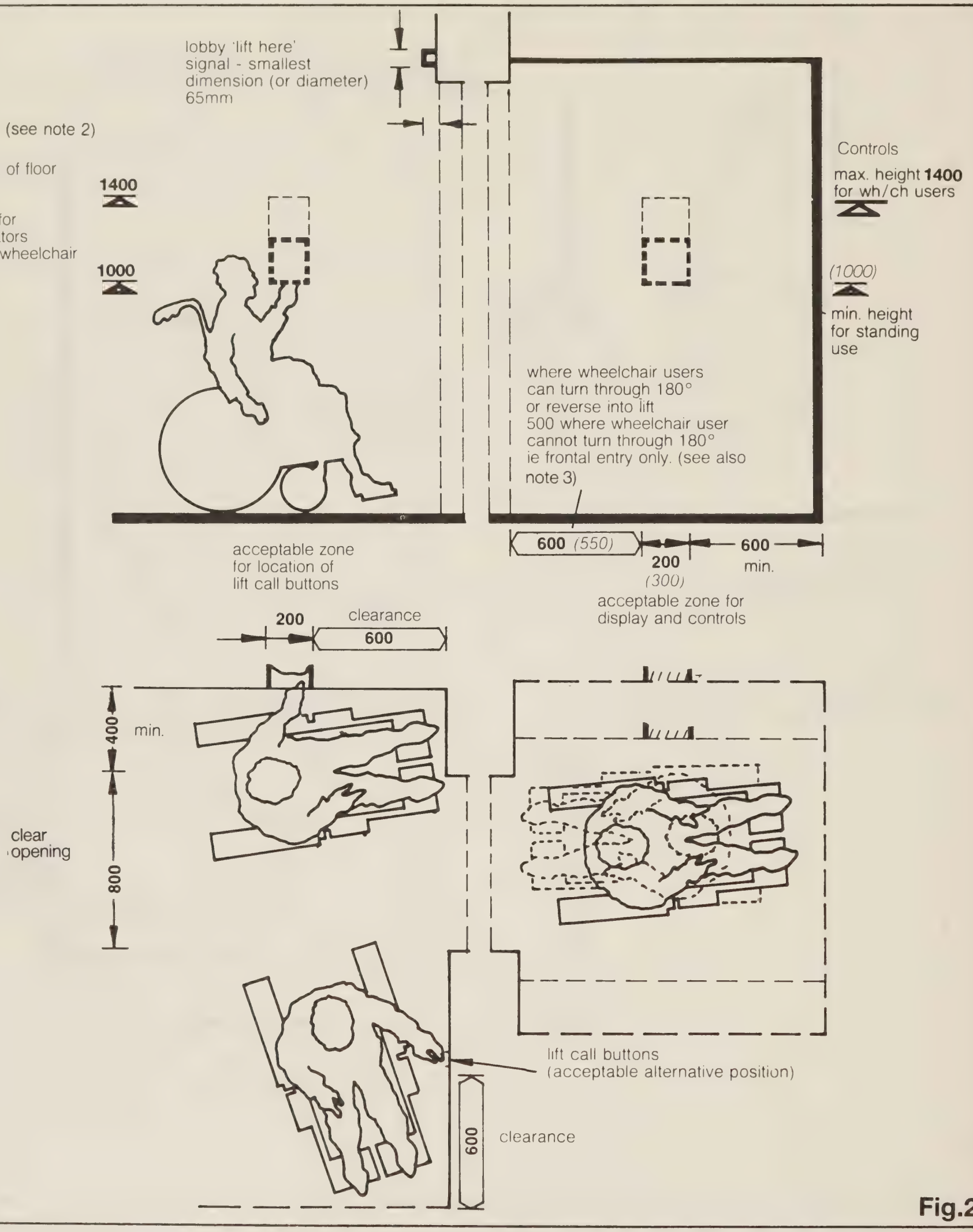

lobby 'lift here' signal - smallest dimension (or diameter) 65mm
Displays (see note 2)
max height of floor indicator
1400
pref. zone for floor indicators small lifts (wheelchair users)
1000
Controls
max. height 1400 for wh/ch users
(1000)
min. height for standing use
where wheelchair users can turn through 180° or reverse into lift 500 where wheelchair user cannot turn through 180° ie frontal entry only. (see also note 3)
600 (550)
200
(300)
600 min.
acceptable zone for location of lift call buttons
acceptable zone for display and controls
200 clearance
600
400 min.
clear opening
800
lift call buttons (acceptable alternative position)
600 clearance

Fig.2

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. To reduce search for the controls upon entry, control panels should be located nearer the door wall rather than the back wall of the lift. Also floor indicators are only readily visible to wheelchair users in small lifts if displayed on side walls (ie not above the door on the door wall as is current practice as these would be behind the wheelchair user adopting frontal entry). A side wall location is acceptable for frontal or reverse entry. In larger lifts where turning space is available, floor indicators can be located above the door or on the door wall, as is current practice.

2. Height location of displays in small lifts - the seated wheelchair users are the more critical - height must therefore be satisfactory for their needs. To make this height, which is very low, more acceptable to standing users the display panel should be slightly angled for easier reading.

3. Position of controls inside lift - dimension from front of lift - 600 where wheelchair users can turn through 180° or reverse into lift (550) acceptable where door recess will accommodate wheelchair footrest. 500 where wheelchair user cannot turn through 180° ie frontal entry only.

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale

Lift

wheelchair/passenger
Type 630 kg *(1100 × 1400)*

Users:
suitable for independent wh/ch users in standard DHSS wh/ch, if necessary accompanied by an assistant.

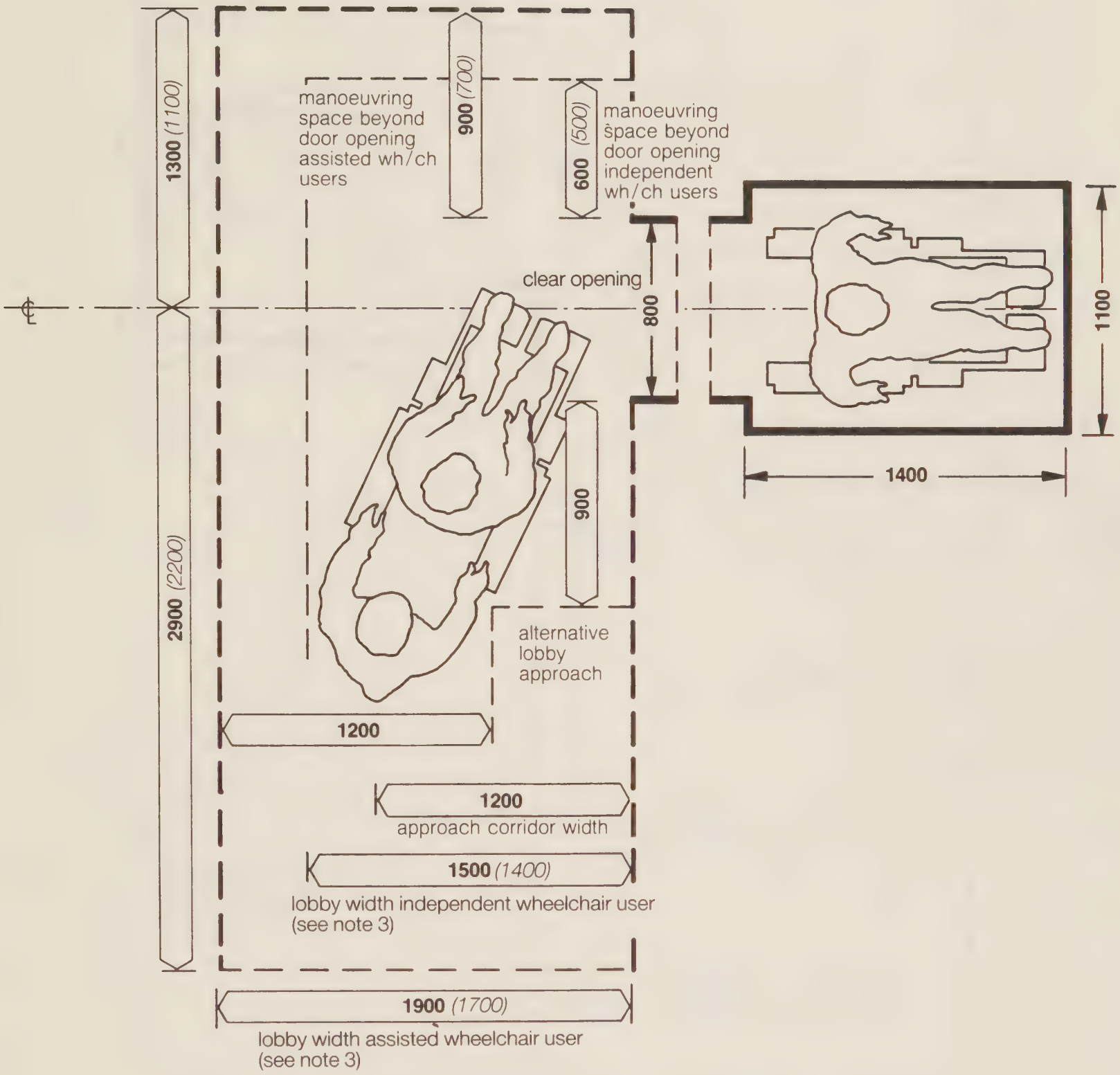


Fig.3

1350 *(1300)*

Preferred minimum *Restricted minimum (not recommended for general use: see explanatory notes)*

1. Wheelchair turning is not possible in any of these lifts. Controls and displays must be accessible and visible to independant wheelchair users who enter forward or reverse into the lift

2. (Displays on access jambs cannot be seen by wheelchair users who enter frontally. Only a side wall display is therefore satisfactory).

3. The dimensions shown are for wheelchair access space only. The overall landing depth and area will need to be larger to comply with BS 5655 part 5 and approved documents 'M' 2/3/4.

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale

Lift wheelchair/passenger

Type 1000 kg *(1600 × 1400)*

Users:
suitable for independent and assisted wh/ch users - independent turning through 180° (depending on door recess of 100 or more and standard wh/ch dimensions)

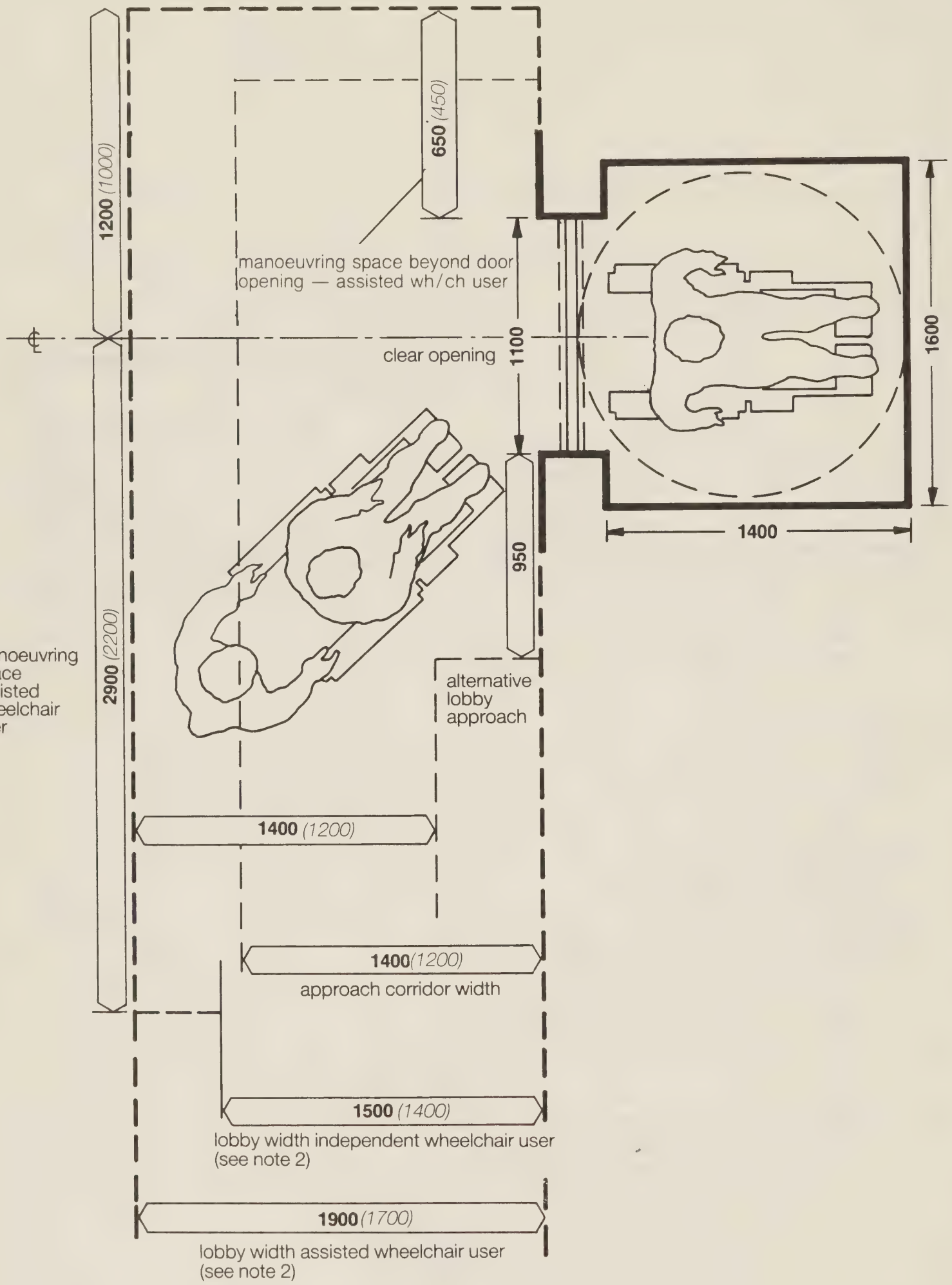


Fig.4

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

1. Wheelchair turning is just possible in the lift, although some independent users may experience difficulty. This lift *(1600 × 1400, 1000kg)* should therefore have controls and displays that are immediately accessible and visible to users who enter either forward or in reverse.

2. The dimensions shown are for wheelchair access space only. The overall landing depth and area will need to be larger to comply with BS 5655 part 5 and approved documents 'M' 2/3/4.

Activities:
Manoeuvring patient on trolley into or out of lift. Space outside lift for 90° bend or turning through 180°

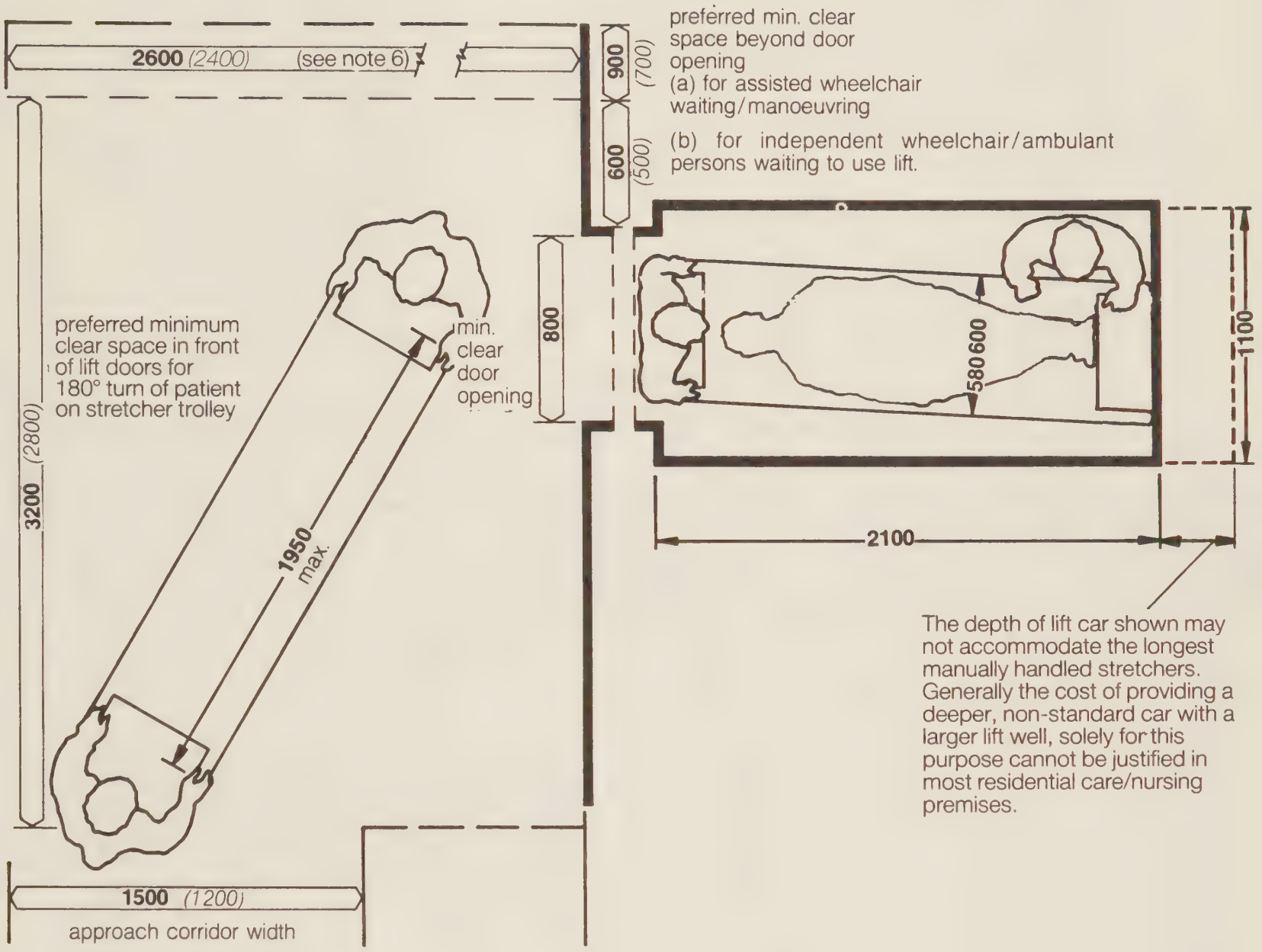
DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale

Lift -

(Stretcher Trolley)
Type 1000 kg *(1100 × 2100)*

Users:
1 or 2 staff moving patient on stretcher trolley, and including the transporting of coffins.

clear turning space carrying stretcher trolley (90° turn)


2600 (2400) (see note 6)
900 (700)
600 (500)
preferred min. clear space beyond door opening
(a) for assisted wheelchair waiting/manoeuvring
(b) for independent wheelchair/ambulant persons waiting to use lift.
800
min. clear door opening
580 600
1100
2100
preferred minimum clear space in front of lift doors for 180° turn of patient on stretcher trolley
3200 (2800)
1950 max.
1500 (1200)
approach corridor width

The depth of lift car shown may not accommodate the longest manually handled stretchers. Generally the cost of providing a deeper, non-standard car with a larger lift well, solely for this purpose cannot be justified in most residential care/nursing premises.

Fig.5

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. Most amubulance stretcher trolleys are up to 1950mm long, although slightly shorter stretcher trolley models are available.
2. Stretcher trolleys (where stretcher poles can be removed) and coffins (also on trolleys) where overall length generally does not exceed 2100 - ie with the use of the door recess, they can be accommodated within the basic lift car length. (for manually handled stretchers see note on Figure 5 above).
3. This lift will also accommodate independent and assisted wheelchair users, but turning within the lift car is not possible.
4. The recommended lift lobby dimensions for manoeuvring a stretcher will satisfactorily accommodate other categories of user.
5. This lift cannot be used as a bed lift.
6. The dimensions shown are for trolley turning space only. The overall landing depth and area will need to larger to comply with BS 5655 part 5 (see text para 4.2).

Activities:
Manoeuvring bed or trolley into or out of lift. Space outside lift for 90° bend of turning through 180°
(see notes on following page).

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale.

Bed Lift

Type: 1600kg (1400x2400)

Users:
1 or 2 staff moving bed or patient trolley (see note 1)

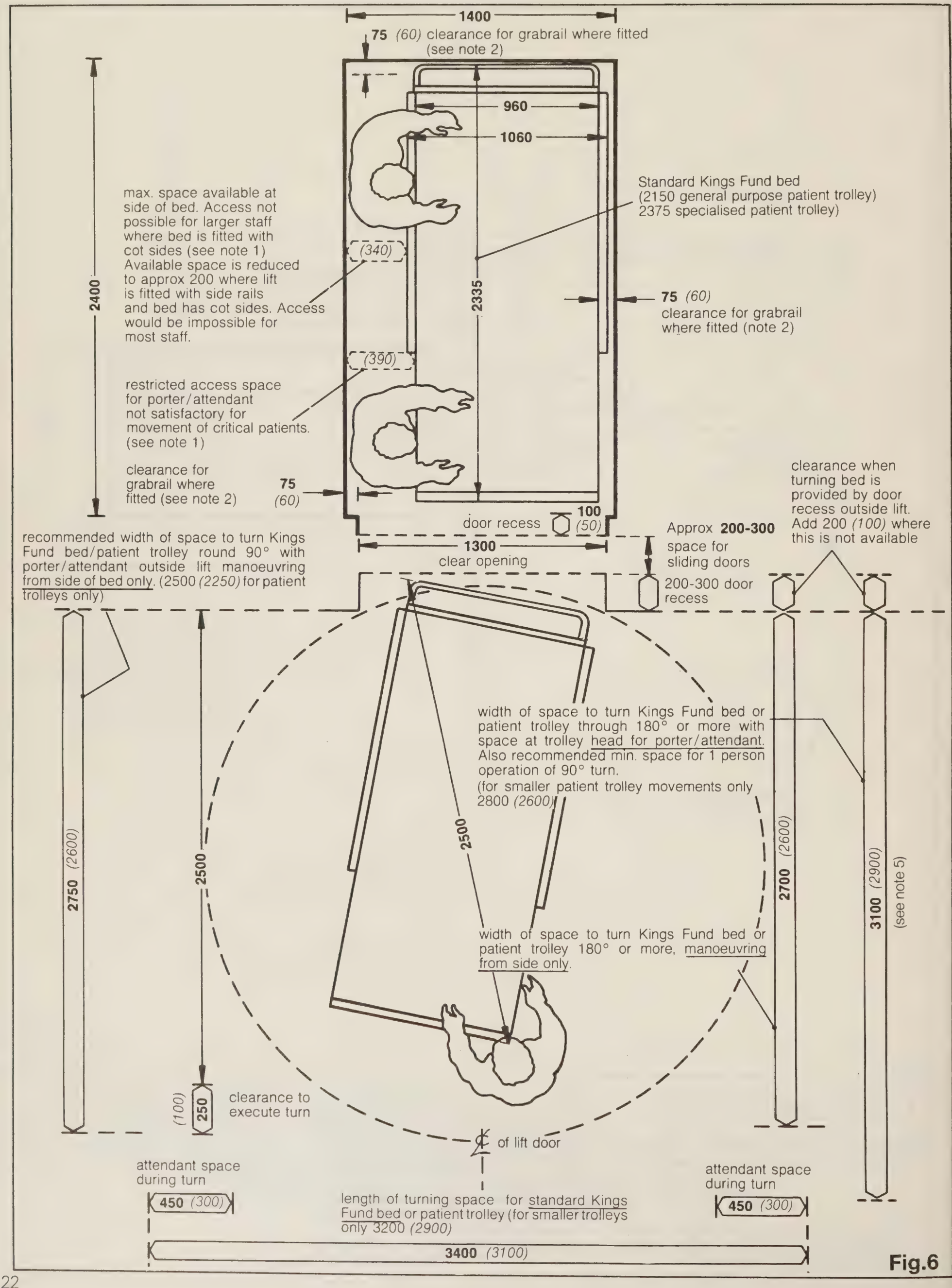

1400
75 (60) clearance for grabrail where fitted (see note 2)
960
1060
Standard Kings Fund bed
(2150 general purpose patient trolley)
2375 specialised patient trolley)
2400
max. space available at side of bed. Access not possible for larger staff where bed is fitted with cot sides (see note 1) Available space is reduced to approx 200 where lift is fitted with side rails and bed has cot sides. Access would be impossible for most staff.
(340)
2335
75 (60) clearance for grabrail where fitted (note 2)
(390)
restricted access space for porter/attendant not satisfactory for movement of critical patients. (see note 1)
clearance for grabrail where fitted (see note 2)
75 (60)
100 (50) door recess
1300 clear opening
Approx 200-300 space for sliding doors
200-300 door recess
clearance when turning bed is provided by door recess outside lift. Add 200 (100) where this is not available
recommended width of space to turn Kings Fund bed/patient trolley round 90° with porter/attendant outside lift manoeuvring from side of bed only. (2500 (2250) for patient trolleys only)
2750 (2600)
2500
width of space to turn Kings Fund bed or patient trolley through 180° or more with space at trolley head for porter/attendant. Also recommended min. space for 1 person operation of 90° turn.
(for smaller patient trolley movements only 2800 (2600))
2500
2700 (2600)
3100 (2900)
(see note 5)
width of space to turn Kings Fund bed or patient trolley 180° or more, manoeuvring from side only.
(100) 250 clearance to execute turn
of lift door
attendant space during turn
450 (300)
length of turning space for standard Kings Fund bed or patient trolley (for smaller trolleys only 3200 (2900)
attendant space during turn
450 (300)
3400 (3100)

Fig.6

Bed Lift

Type 1600 kg (1400 × 2400)

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. This size lift will only just accommodate a basic Kings Fund bed. It will not accommodate an extended bed, and is not satisfactory for beds with orthopaedic beams. It is therefore not recommended for use in health buildings, especially where critical patient movements (ie patient requiring attendance) are wanted. It is minimally acceptable where the movement of equipment only is to be considered.
2. Handrails or buffers should not be fitted as these would reduce the width and depth of car to a point where even this transportation of the standard basic Kings Fund bed would not be possible. Accommodation for a porter/attendant moving the bed is very restricted. Two persons will only be accommodated with difficulty. Where buffer/handrails are fitted, this lift cannot be used for the transportation of Kings Fund specification beds.
3. The lift will accommodate a patient trolley, but larger trolleys must use the door recess. This gives very little tolerance for normal trolley and associated attendant movements and is therefore not very satisfactory. The trolley space requirements of 800x2375 will accommodate most types of commonly occuring patient trolleys (eg X.ray top type), the smaller trolley dimensions (800x2150) relates to the multi-purpose patient trolleys rather than specialised ones. It is possible that patient trolleys may fit underneath any handrail that may be in the lift. A clearance of 75 *(60)* for rail at side of lift car does not seriously affect trolley access but rails at back wall may impede larger trolleys. In a restricted space however, the rail overhang could inconvenience or even be hazardous to a patient on a trolley.
4. Beds and trolleys are assumed to have 2 fixed and 2 freely rotating castors. Where all four castors are freely rotating 2 porters/attendants are required to manoeuvre equipment satisfactorily.
5. The dimensions shown are for bed turning space only. The overall landing depth and area will need to be larger to comply with BS 5655 part 5 (see text para 4.2).

Fig.7

Activities:
Manoeuvring bed or trolley into or out of lift. Space outside lift for 90° bend or turning through 180°.
(see notes on following page).

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale.

Bed Lift

Type: 1800 kg (1600 x 2400)

Users:
1 or 2 staff moving bed or patient trolley (see note 2) with or without side attendant.

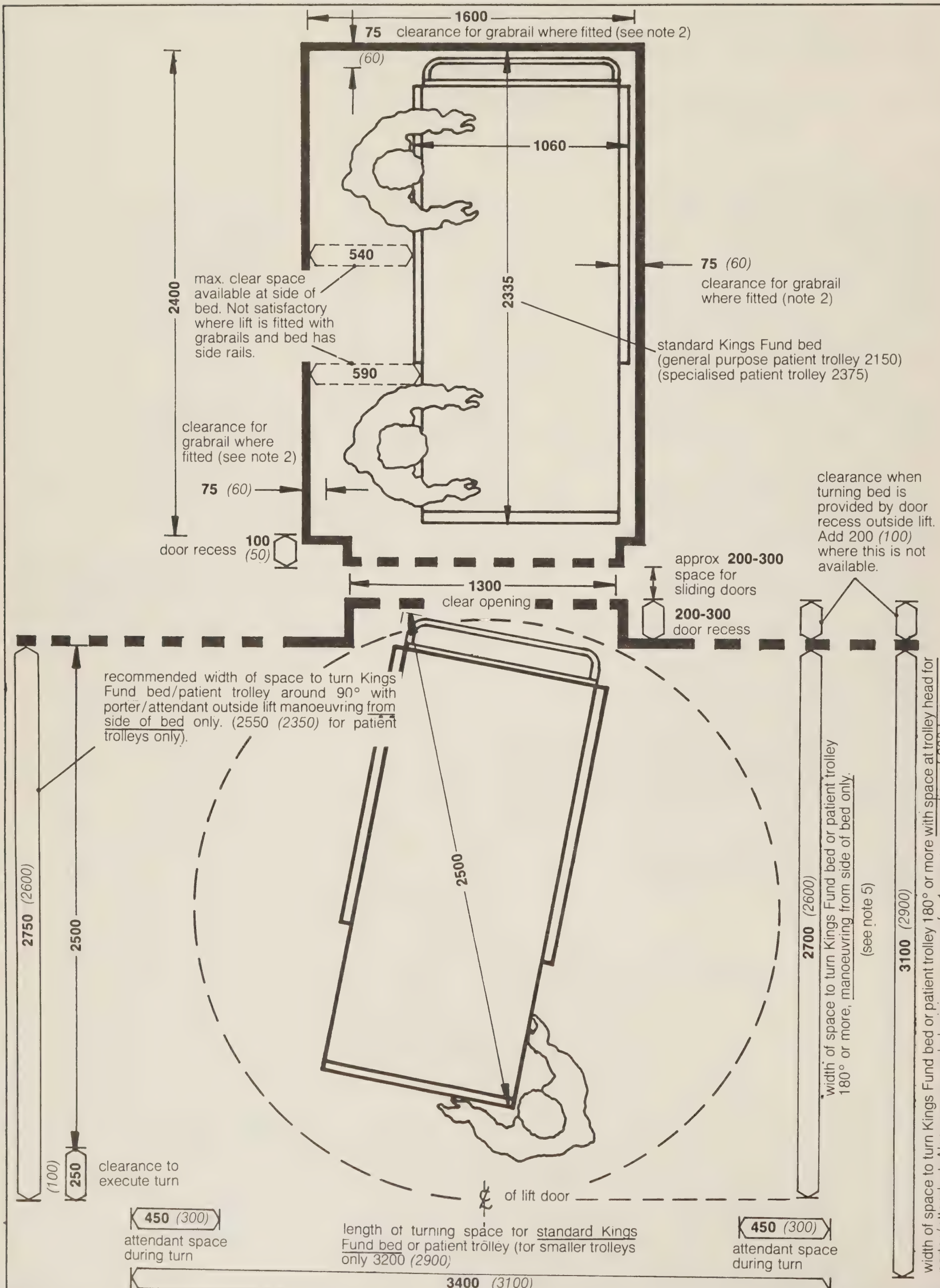

1600
75 clearance for grabrail where fitted (see note 2)
(60)
1060
540
max. clear space available at side of bed. Not satisfactory where lift is fitted with grabrails and bed has side rails.
590
2400
2335
75 (60)
clearance for grabrail where fitted (note 2)
standard Kings Fund bed
(general purpose patient trolley 2150)
(specialised patient trolley 2375)
clearance for grabrail where fitted (see note 2)
75 (60)
door recess
100 (50)
1300
clear opening
approx 200-300 space for sliding doors
200-300 door recess
clearance when turning bed is provided by door recess outside lift. Add 200 (100) where this is not available.
recommended width of space to turn Kings Fund bed/patient trolley around 90° with porter/attendant outside lift manoeuvring from side of bed only. (2550 (2350) for patient trolleys only).
2500
2750 (2600)
(100)
250
clearance to execute turn
2700 (2600)
width of space to turn Kings Fund bed or patient trolley 180° or more, manoeuvring from side of bed only.
(see note 5)
3100 (2900)
width of space to turn Kings Fund bed or patient trolley 180° or more with space at trolley head for porter/attendant. Also recommended minimum space for 1 person operation of 90° turn.
(for smaller patient trolley movements only - 2800 (2600))
of lift door
450 (300)
attendant space during turn
length of turning space for standard Kings Fund bed or patient trolley (for smaller trolleys only 3200 (2900)
450 (300)
attendant space during turn
3400 (3100)

Fig.8

Bed Lift

Type 1800 kg (1600 × 2400)

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. This size lift will only just accommodate a basic Kings Fund bed. It will not accommodate an extended bed, and is not satisfactory for beds with orthopaedic beams. It is therefore not recommended for general use in health buildings, especially where critical patient movements (i.e. of patient requiring attendance) are involved. The lift is satisfactory where the movement of equipment only is to be considered.
2. Handrails or buffer rails should preferably not be fitted, especially to the back wall of the car as this will reduce effective car space. Where rails are fitted to the back wall this lift cannot be used for the transportation of Kings Fund specification beds, and rails fitted to both side walls will excessively impede porter/attendance access space. Where a grabrail is fitted to one side wall only, porter/attendant access space will be very restricted.
3. The lift will accommodate a patient trolley, but larger trolleys must use the door recess. This gives very little tolerance for normal trolley and associated attendant movements, and is therefore not very satisfactory. The trolley space requirements of 800x2375 will accommodate most types of commonly occurring patient trolleys (eg X-ray top type). The smaller trolley dimensions (800x2150) relates to multi-purpose patient trolleys rather than specialised ones. It is possible that patient trolleys may fit underneath any handrail that may be in the lift. A clearance of 75 (60) for rail at side of car would not seriously affect trolley access, but a rail on the back wall would however impede larger trolleys. In a restricted space however the tail overhang could inconvenience or even be hazardous to a patient on a trolley..
4. Beds and trolleys assumed to have 2 fixed and 2 freely rotating castors. Where all are freely rotating 2 persons are essential to manoeuvre the equipment satisfactorily.
5. The dimensions shown are for bed turning space only. The overall landing depth and area will need to be larger to comply with BS 5655 part 5 (see text para 4.2).

Fig.9

Activities:
Manoeuvring bed into or out of lift,, space outside lift for 90° bend or turning through 180°
(see notes on following page).

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale.

Bed Lift

Type: 2000kg (1500x2700)

Users:
2 staff moving Kings Fund bed with orthopaedic attachments, with or without side attendant

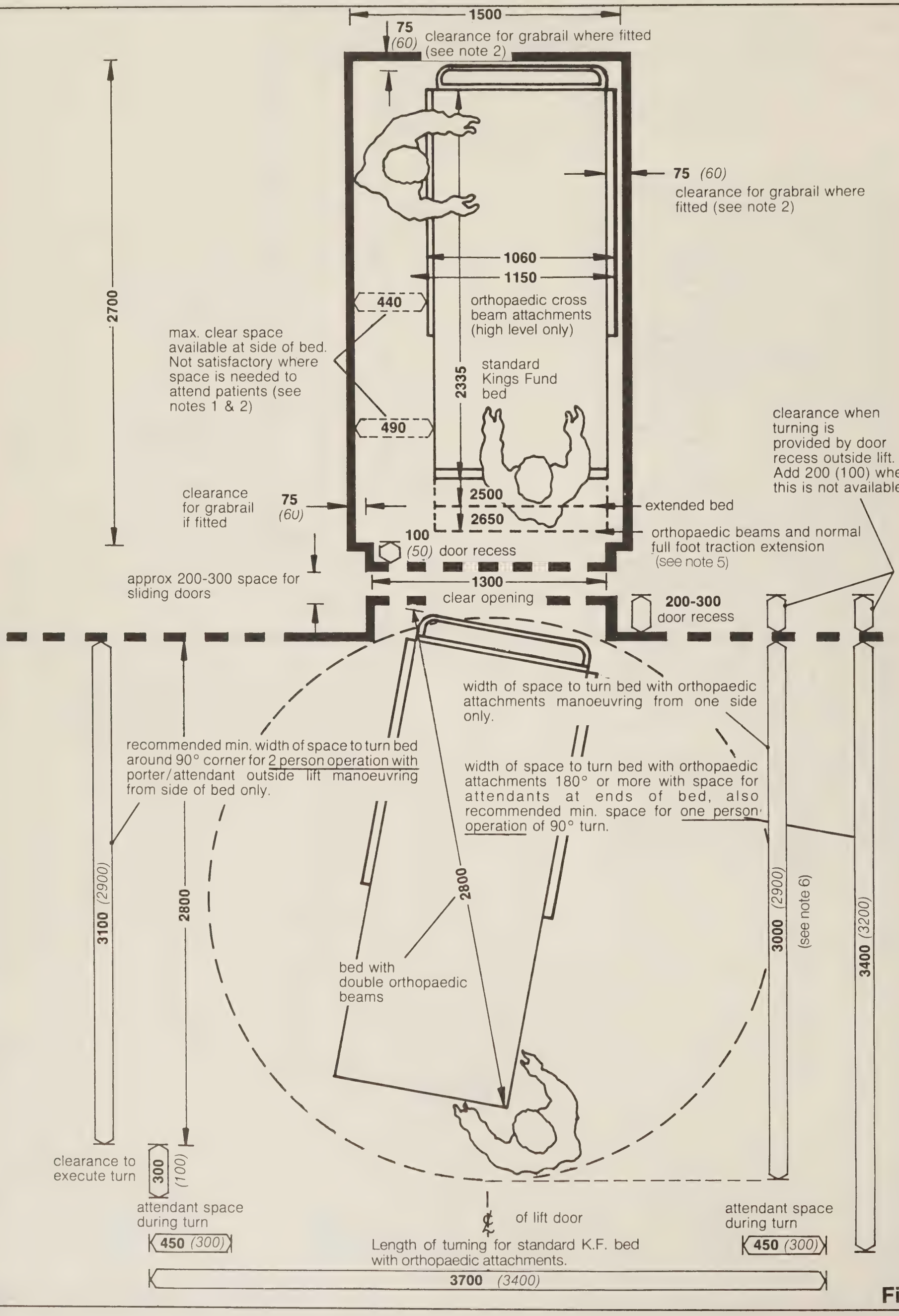

1500
75 (60) clearance for grabrail where fitted (see note 2)
2700
75 (60) clearance for grabrail where fitted (see note 2)
1060
1150
440
orthopaedic cross beam attachments (high level only)
max. clear space available at side of bed. Not satisfactory where space is needed to attend patients (see notes 1 & 2)
2335
standard Kings Fund bed
490
clearance when turning is provided by door recess outside lift. Add 200 (100) where this is not available
clearance for grabrail if fitted
75 (60)
2500
2650
extended bed
100 (50) door recess
orthopaedic beams and normal full foot traction extension (see note 5)
approx 200-300 space for sliding doors
1300
clear opening
200-300 door recess
width of space to turn bed with orthopaedic attachments manoeuvring from one side only.
recommended min. width of space to turn bed around 90° corner for 2 person operation with porter/attendant outside lift manoeuvring from side of bed only.
width of space to turn bed with orthopaedic attachments 180° or more with space for attendants at ends of bed, also recommended min. space for one person operation of 90° turn.
3100 (2900)
2800
2800
3000 (2900)
(see note 6)
3400 (3200)
bed with double orthopaedic beams
clearance to execute turn
300 (100)
attendant space during turn
450 (300)
of lift door
attendant space during turn
450 (300)
Length of turning for standard K.F. bed with orthopaedic attachments.
3700 (3400)

Fig.10

Bed Lift

Type 2000kg (1500 × 2700)

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. Because of restricted lift car width, this lift is not recommended for the frequent movement of critical patients (ie patients who require constant medical or nursing attendance when being moved)
2. Handrails or buffer rails should preferably not be fitted, especially to the back wall of the car, as this will reduce the effective car space, and could prevent beds with orthopaedic beams being accommodated. Even where a grabrail is fitted to one side wall only, residual space for porters/attendants at side of bed fitted with cot sides (side rails) will be unacceptable in a car of this width.
3. As the clear lift door opening of 1300 is only 150 wider than the Kings Fund bed with double orthopaedic beams (250 wider than bed with cot sides/side rails), the bed must be moved fully outside the lift before it can be turned and that porters/attendants must pass through the opening before or after the bed i.e. a position at the side of the bed cannot be maintained when passing through the opening.
4. Where bed length extends beyond the effective lift length, to fit in the lift, the bed must be positioned more centrally so that the recess of the lift doors accommodates the excess length. It is probable that this would give the porters/attendants too little space to get through between bed and lift door jamb in order to push/pull the bed in/out of the lift.
5. Where foot traction extensions slightly exceed overall length dimensions of the double orthopaedic beam structure shown, this can usually be satisfactorily accommodated within the lift door recess. Similarly, as the extension is usually located within the middle 1/3 of the structure, the critical diagonal dimension of the bed is not increased, and turning allowances are therefore also satisfactory. (Extensions greater than 100-150 will however present difficulties).
6. The dimensions shown are for bed turning space only. The overall landing depth and area will need to be larger to comply with BS 5655 part 5 (see text para 4.2).

Fig.11

Activities:
Manoeuvring bed into or out of lift. Space outside lift for 90° bend or turning bed through 180°
(see notes on following page).

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale.

Bed Lift

Type: 2500kg (1800x2700)

Users:
2 staff moving Kings Fund bed with orthopaedic attachments with or without side attendants and any accompanying equipment.

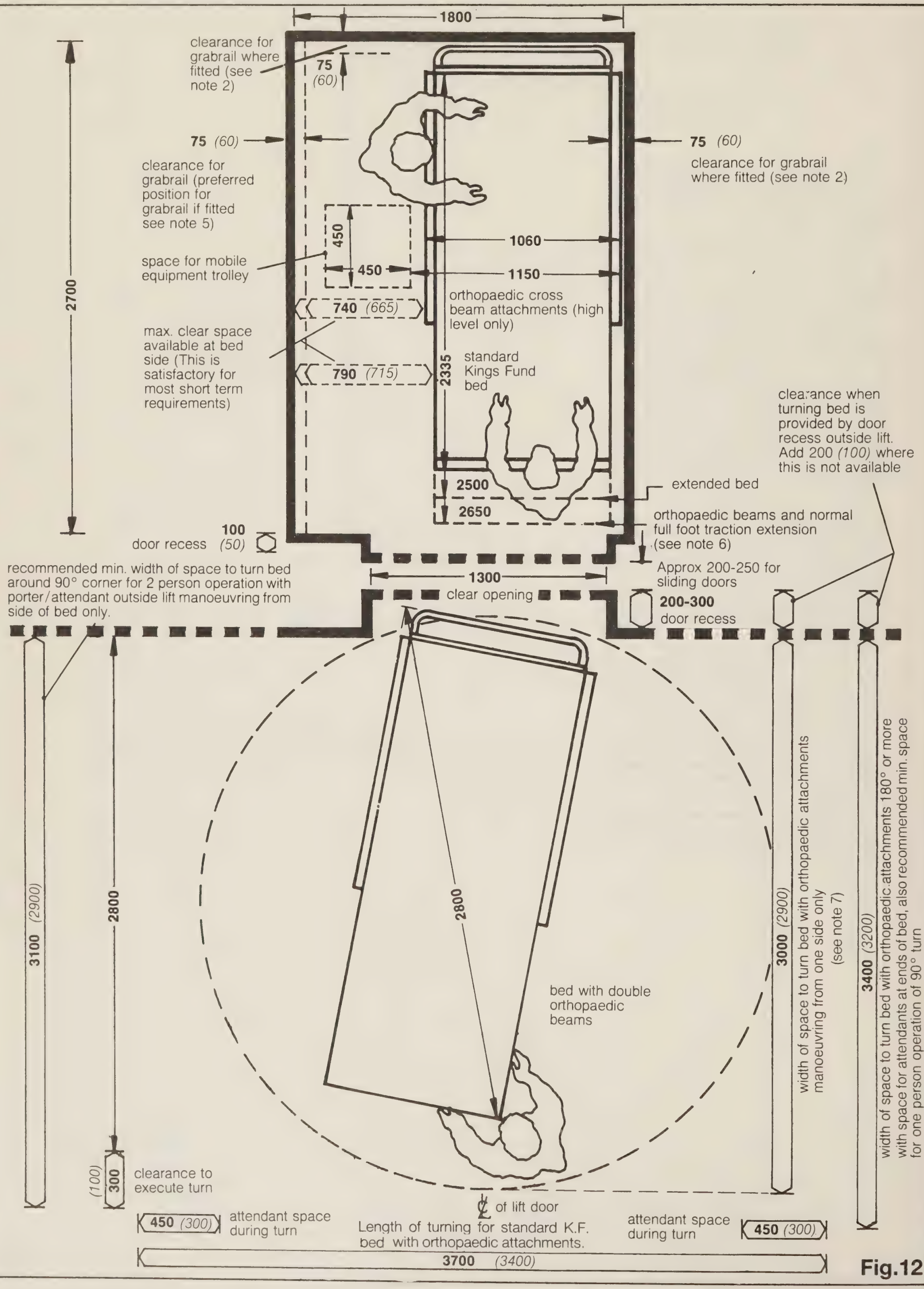

1800
clearance for grabrail where fitted (see note 2)
75 (60)
75 (60)
clearance for grabrail (preferred position for grabrail if fitted see note 5)
75 (60)
clearance for grabrail where fitted (see note 2)
2700
450
450
space for mobile equipment trolley
1060
1150
740 (665)
orthopaedic cross beam attachments (high level only)
max. clear space available at bed side (This is satisfactory for most short term requirements)
790 (715)
2335
standard Kings Fund bed
clearance when turning bed is provided by door recess outside lift. Add 200 (100) where this is not available
2500
2650
extended bed
orthopaedic beams and normal full foot traction extension (see note 6)
100
door recess (50)
recommended min. width of space to turn bed around 90° corner for 2 person operation with porter/attendant outside lift manoeuvring from side of bed only.
1300
clear opening
Approx 200-250 for sliding doors
200-300
door recess
3100 (2900)
2800
2800
3000 (2900)
width of space to turn bed with orthopaedic attachments manoeuvring from one side only (see note 7)
3400 (3200)
width of space to turn bed with orthopaedic attachments 180° or more with space for attendants at ends of bed, also recommended min. space for one person operation of 90° turn
bed with double orthopaedic beams
(100)
300
clearance to execute turn
℄ of lift door
450 (300)
attendant space during turn
Length of turning for standard K.F. bed with orthopaedic attachments.
attendant space during turn
450 (300)
3700 (3400)

Fig.12

Bed Lift

Type 2500 kg (1800 × 2700)

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. This is the preferred standard lift (ie minimum lift dimensions) for the frequent movement of patients on beds, particularly where patients require (or may require) constant medical or nursing attendance when being moved.
2. Handrails or buffer rails should preferably not be fitted to the back wall of the car, as this would effectively reduce car depth, and could prevent beds with orthopaedic beams being accommodated. It is recommended also that grab rail provision should be limited to one side wall of the car only to maintain a larger clear width dimension. This will allow any items of mobile equipment to accompany critical patients when being moved.
3. As the clear lift door opening of 1300 is only 150 wider than the Kings Fund bed, fitted with double orthopaedic beams (250 wider than bed with cot sides/side rails), the bed must be moved fully outside the lift before it can be turned and that porters/attendants must pass through the opening before or after the bed ie a position at the side of the bed cannot be maintained when passing through the opening.
4. Where bed length extends beyond effective lift, to fit in the lift the bed must be positioned more centrally so that the recess of the lift doors accommodates the excess length, it is probable that this would give the porters/attendants too little space to get through between bed and lift door jamb in order to push/pull the bed in/out of the lift.
5. A grabrail would be fitted where the lift is to be used by semi-ambulant patients and should be fitted on the side adjacent to the lift control panel. Height above floor 950 *(900)*.
6. Where foot traction extensions slightly exceed overall length dimensions of double orthopaedic beam structure shown, this can usually be satisfactorily accommodated within the lift door recess. Similarly, as this extension is usually located within the middle 1/3 of the structure, the critical diagonal dimension of the bed is not increased and turning allowances are therefore also satisfactory. (Extension greater than 100-150 will however present difficulties).
7. The dimensions shown are for bed turning space only. The overall landing depth and area will need to be larger to comply with BS 5655 part 5 (see text para 4.2).

Fig.13

Activities:
Ramped access for independent and/or assisted wheelchair use, also ambulant disabled using walking aids or assisted.

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale

Ramp

Medium/long

Users:
Wheelchair disabled and ambulant disabled

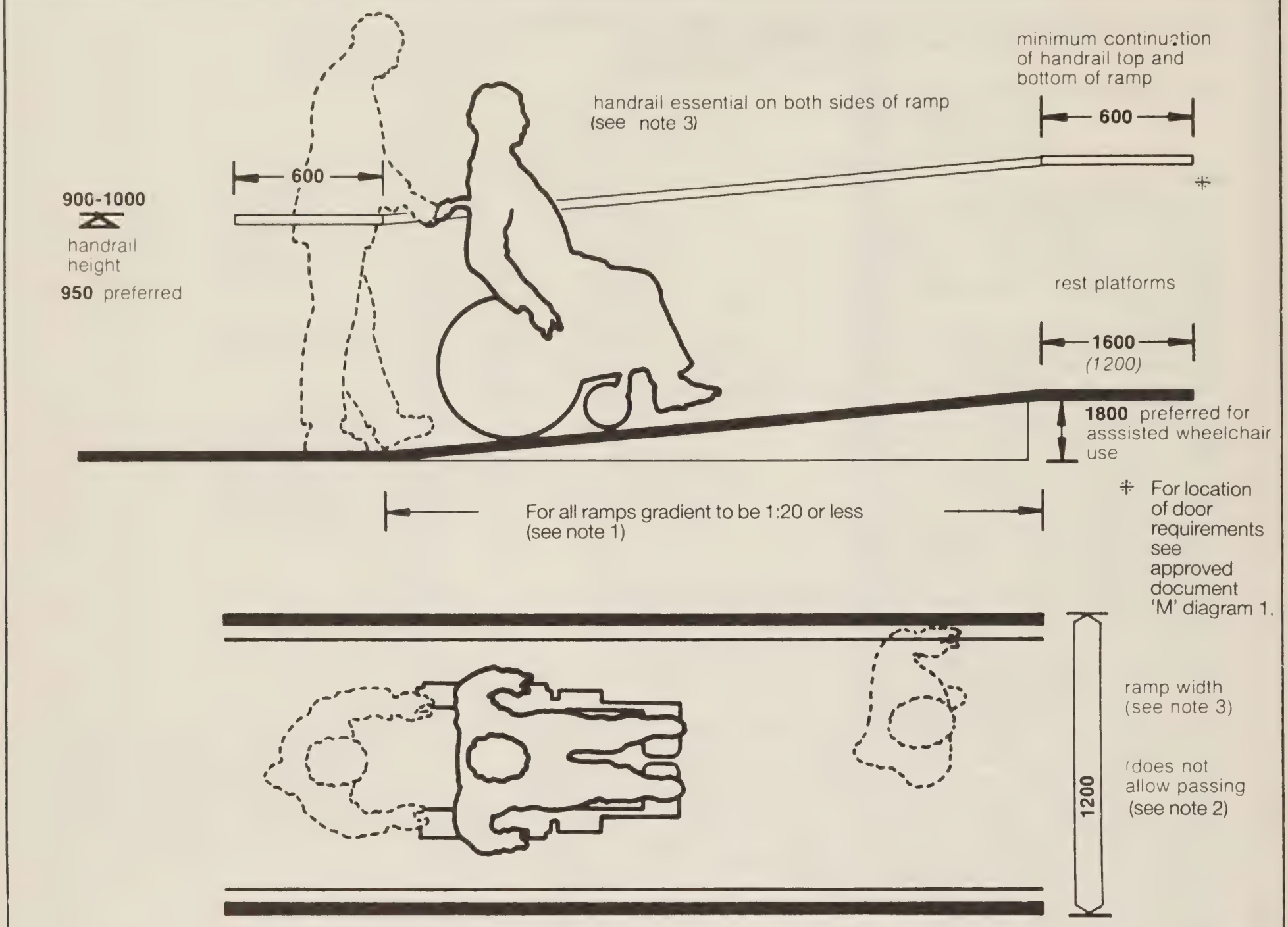

minimum continuation of handrail top and bottom of ramp
600
handrail essential on both sides of ramp (see note 3)
600
900-1000
handrail height
950 preferred
rest platforms
1600
(1200)
1800 preferred for asssisted wheelchair use
For all ramps gradient to be 1:20 or less (see note 1)
‡ For location of door requirements see approved document 'M' diagram 1.
ramp width (see note 3)
1200
does not allow passing (see note 2)

Fig.14

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. Maximum ramp gradients not to exceed 1:20

2. For width of ramp for passing see relevant data sheets for straight movement, eg two wheelchairs (independent) passing 1800, wheelchairs (independent) passing ambulant person, 1500. Restricted movement dimensions should however not be used owing to increased difficulty in manoeuvring on ramps.

3. Handrail design must not obstruct wheelchair manoeuvring, especially by independent wheelchair users. Where this occurs ramp width must be taken as clear manoeuvring space between handrails. Clear height of space below handrail must be 850 to facilitate free and safe arm movements.

4. For ramps exceeding 10,000mm lengths, will require landing rest platforms. See approved document 'M' diagram 1.

5. Ramps down, serving only as a means of escape in the event of fire or emergency may have a gradient of 1:12.

6. Ramps must have raised curbs at least 100mm high on any open side.

7. Guardings and handrails to be provided in accordance with approved document 'K' 1/2, appendix 'A'.

Activities:
Moving from pavement to roadway or vice versa by wheelchair users and mobile equipment.

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale

Dropped Kerb

Users:
Assisted and independent wheelchair users.

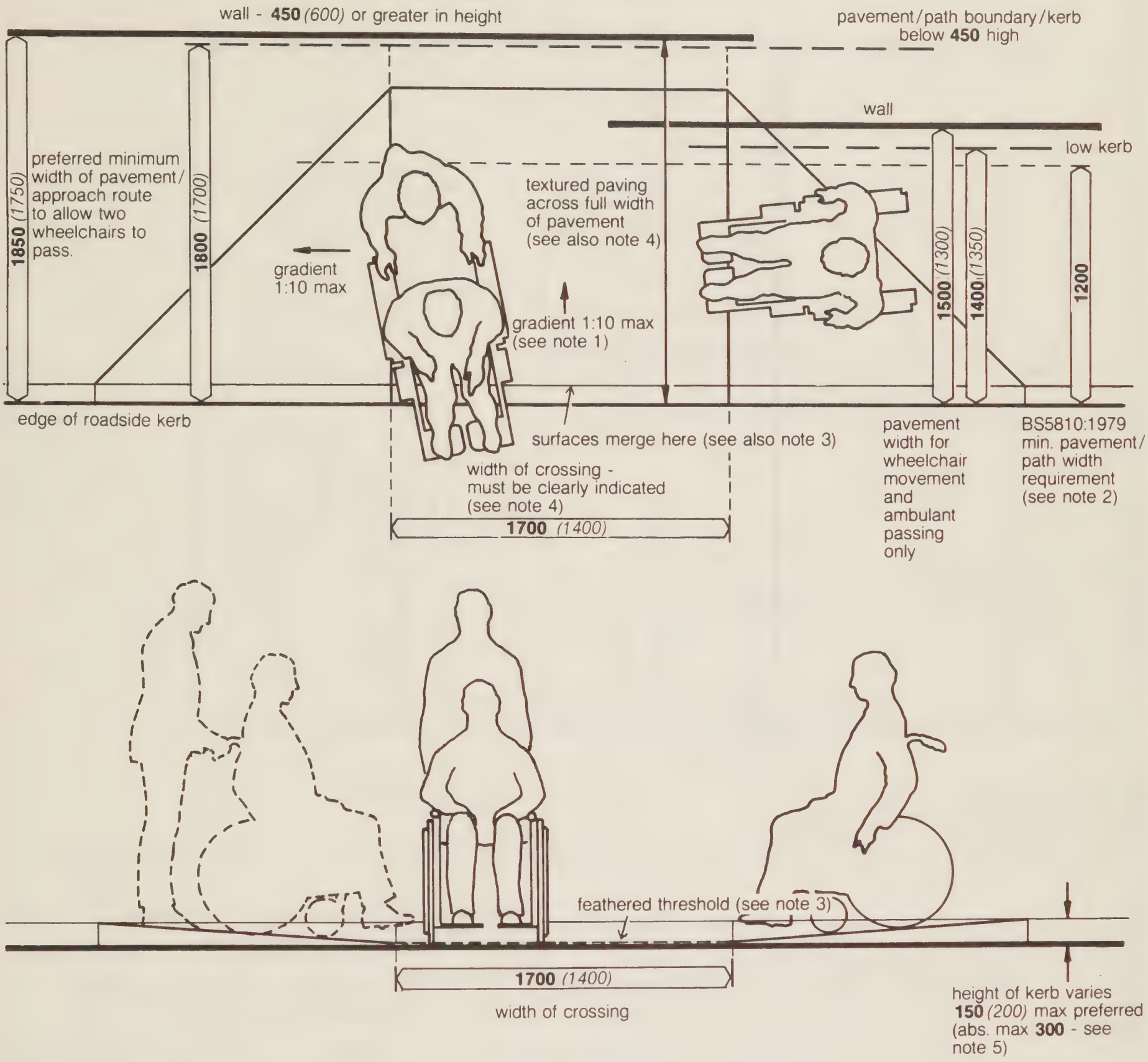

wall - **450** *(600)* or greater in height
pavement/path boundary/kerb below **450** high
wall
low kerb
1850 *(1750)*
preferred minimum width of pavement/ approach route to allow two wheelchairs to pass.
1800 *(1700)*
gradient 1:10 max
textured paving across full width of pavement (see also note 4)
gradient 1:10 max (see note 1)
1500 *(1300)*
1400 *(1350)*
1200
edge of roadside kerb
surfaces merge here (see also note 3)
width of crossing - must be clearly indicated (see note 4)
1700 *(1400)*
pavement width for wheelchair movement and ambulant passing only
BS5810:1979 min. pavement/ path width requirement (see note 2)
feathered threshold (see note 3)
1700 *(1400)*
width of crossing
height of kerb varies **150** *(200)* max preferred (abs. max **300** - see note 5)

Fig.15

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. Many dropped kerbs as currently constructed do not comply with the requirements of BS5810:1979 in that the gradient of the ramps often significantly exceeds the stipulated maximum of 1:10 (Gradients of 1:4 are common - ie a rise of 150 in a horizontal length of 600). User trials indicate that gradients steeper than 1:6 can be dangerous especially for independent users e.g. amputees as the wheelchair can tip over backwards during ascent. It is particularly important that the limit of 1:10 should not be exceeded in health buildings.

2. Approved document 'M'. Access for the disabled people to buildings, requires that all public approach routes to buildings be not less than 1200 wide. This will provide for only very restricted wheelchair and ambulant person passing space. Two wheelchairs cannot pass on a path of this width and is therefore generally unsatisfactory for health buildings where use by persons in wheelchairs (or movement of patient trolleys) may be frequent.

3. Road level and roadside kerb are best blended at intersections, but where a slight raised threshold is unavoidable, this must be clearly defined with colour contrast and good illumination, be feathered in detail and not exceed 25mm in height.

4. To assist location of the crossing by blind and partially sighted users the pavement surface must be textured. This should extend the full width of the pavement/path andbe associated with the width of the crossing, the width of which must also be clearly indicated for sighted users.

5. Roadside kerb heights over 300 will necessitate ramp lengths in excess of 3 metres, where gradient may be reduced to 1:12 (see Ramps data sheet).

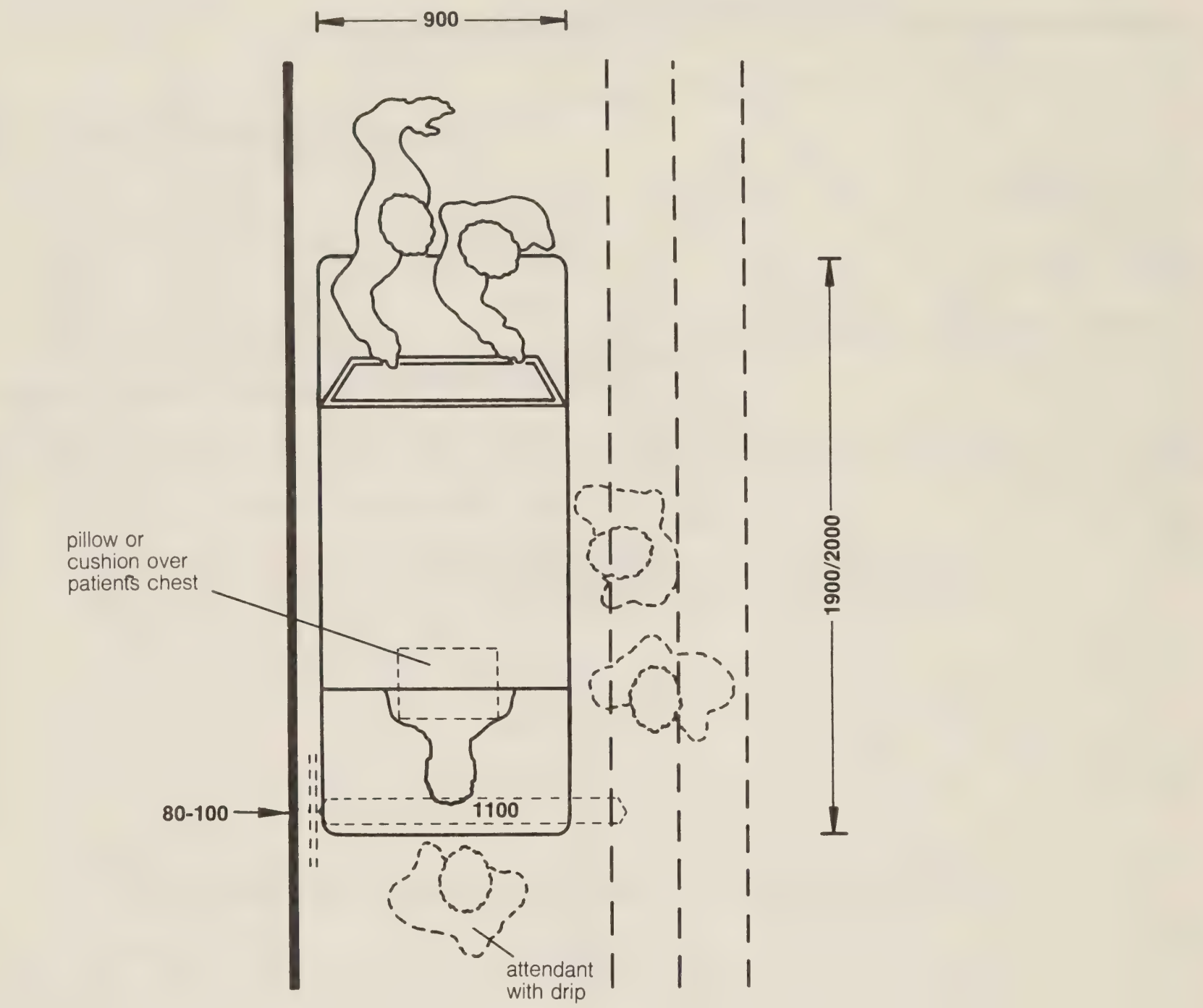
Activities:
Mattress evacuation in the event of fire or emergency - dragging patient on roped or taped mattress down stairs. Stair with or without space for ambulant person passing.

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale

Staircase -
Mattress evacuation

Straight Flights and
approach corridors

Users:
1, 2 or 3 attendants dragging patient on mattress (see note 2)



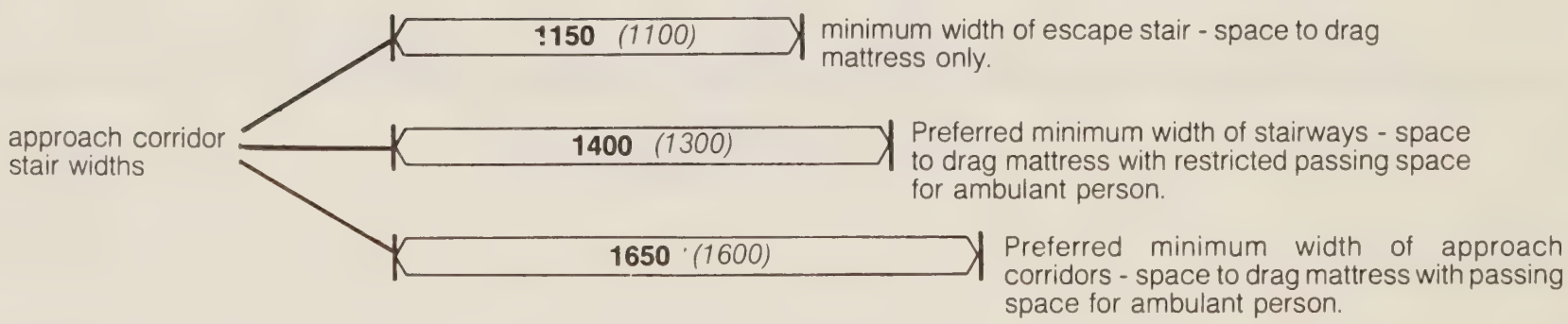

1150 (1100)
minimum width of escape stair - space to drag mattress only.
approach corridor
stair widths
1400 (1300)
Preferred minimum width of stairways - space to drag mattress with restricted passing space for ambulant person.
1650 (1600)
Preferred minimum width of approach corridors - space to drag mattress with passing space for ambulant person.

Fig.16

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. For patient evacuation the number of turning manoeuvres in descending a staircase should be as few as possible.

2. A minimum of 2 attendants are preferred (but not always available in the event of an emergency). Two female attendants may be essential to pull or safely control descent of large/heavy patient down flights or around half-landings.

3. The dimensions shown refer to clear width between the balusters or between balusters and the wall face.

4. Access points to staircases should be clearly and easily identified; be positioned to minimise travel distances for evacuation; to eliminate possible impediment to other (normal or emergency) traffic routes.

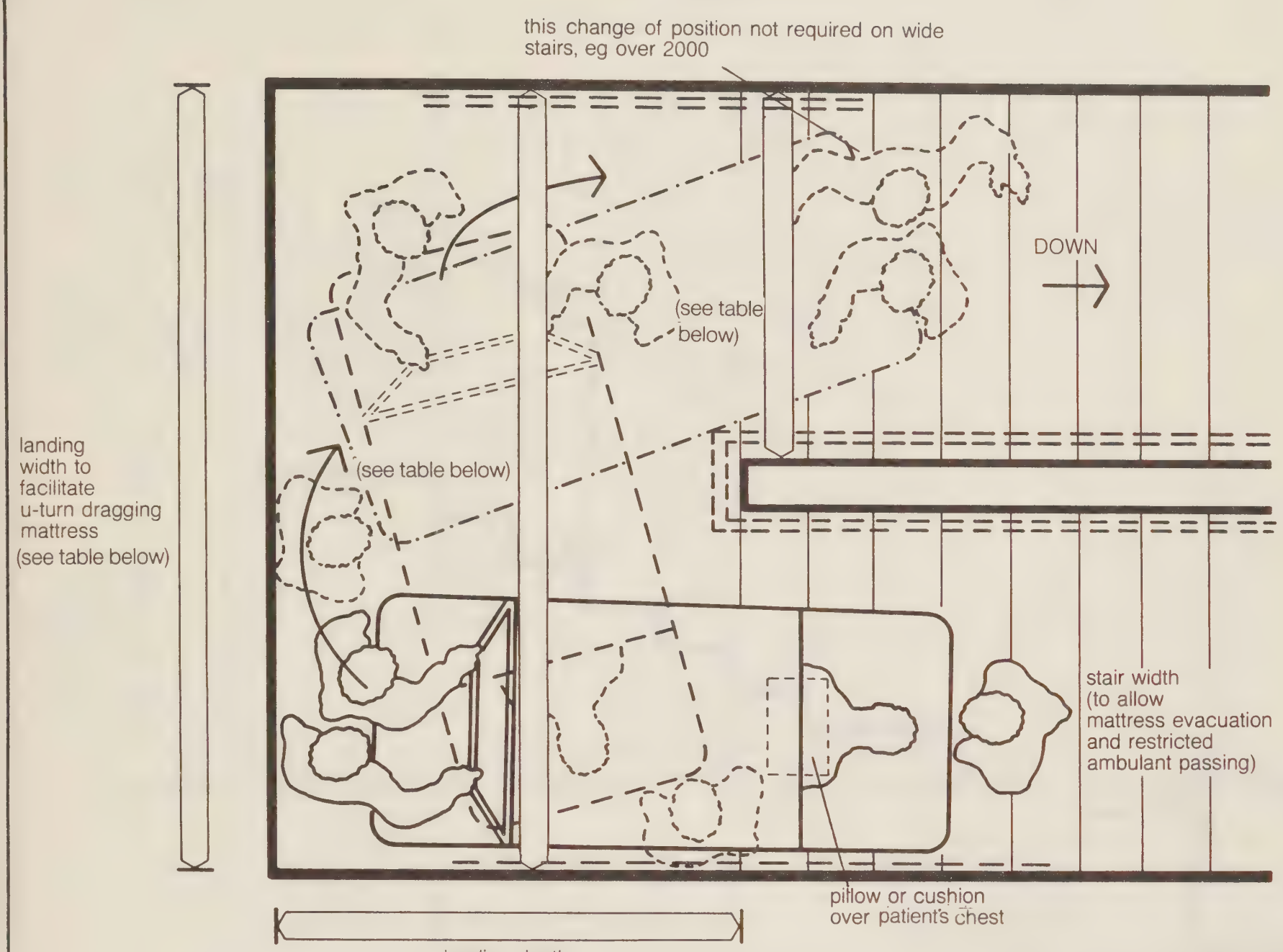
Activities:
Mattress evacuation in the event of fire or emergency. Dragging patient on roped or taped mattress around stairway half landing.

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale

Staircase - Mattress Evacuation

Landings

Users:
1, 2 or 3 attendants dragging patient on mattress (see note 2)


this change of position not required on wide stairs, eg over 2000
DOWN
(see table below)
(see table below)
landing width to facilitate u-turn dragging mattress (see table below)
stair width (to allow mattress evacuation and restricted ambulant passing)
pillow or cushion over patient's chest
landing depth (see table below)

Alternative stair and landing dimensions to facilitate mattress evacuation

MIN. LANDING WIDTH (2xstair width + well)	STAIR WIDTH	LANDING DEPTH	
2800	1100	1950	allows mattress evacuation only (ie no pedestrian passing
2800	1200	1925	
2800	1300	1850	allows mattress evacuation and restricted ambulant passing
3000	1400	1750	
3200	1500	1550	
3400	1600	1450	allows mattress evacuation and ambulant passing
3800	1800	1350	

Fig.17

Notes:

1. For patient evacuation, the number of turning manoeuvres necessary in descending a staircase should be as few as possible.

2. A minimum of 2 attendants are preferred (but not always available in the event of an emergency).

3. The dimensions shown refer to clear width between the banisters, or between the banisters and wall face.

Activities:
Walking up and down stairs

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale

Internal Stairway

Users:
ambulant disabled with and without assistance.

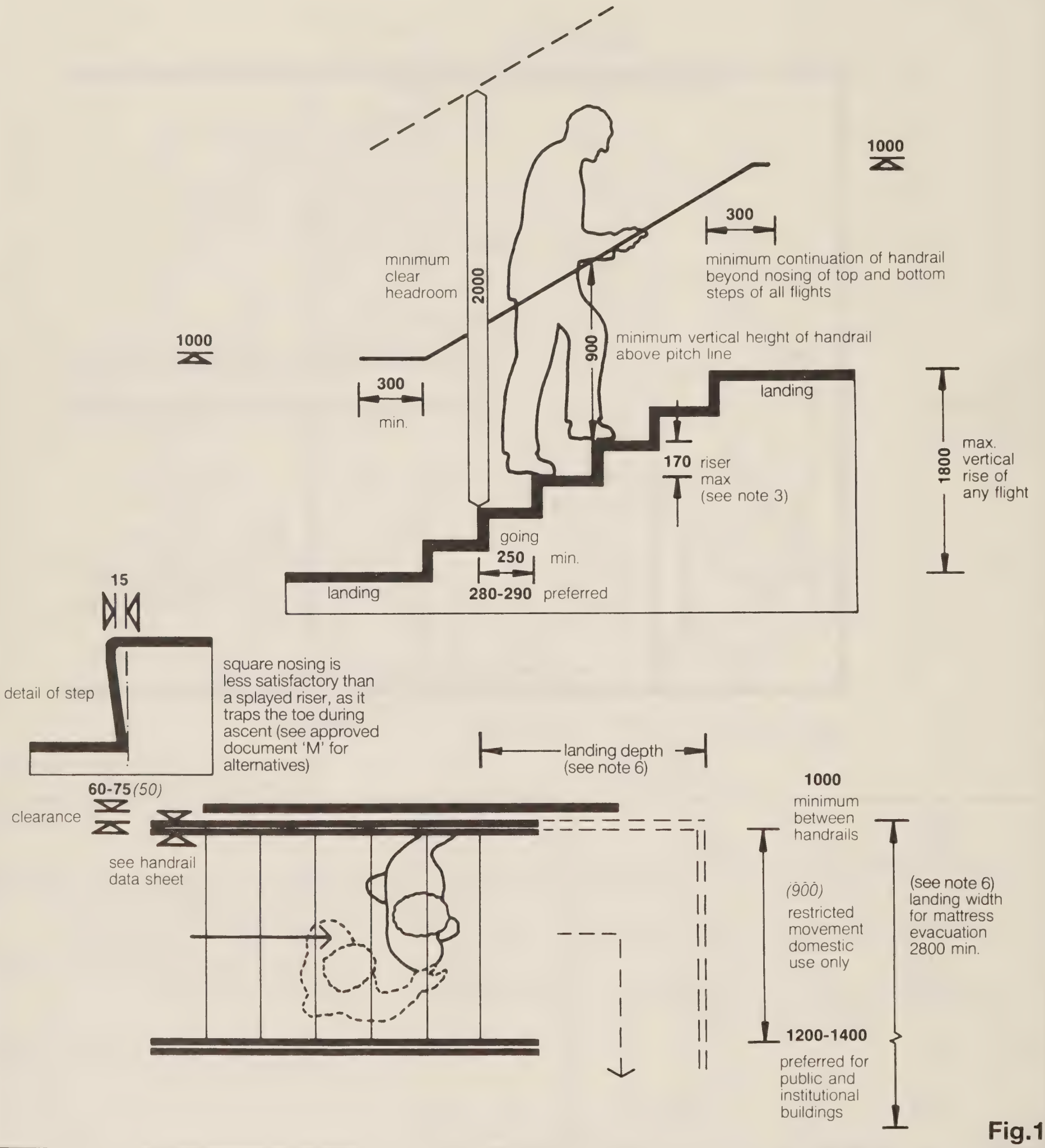


Fig.18

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes

1. The most efficient stair in terms of energy expenditure, also the safest in that stumbling is minimised, is provided by an angle/pitch of 30°. This is afforded by a stair with risers of 170 and treads of 290.

2. Open-risers and winders of splayed steps are hazardous for disabled persons.

3. It is also essential that all risers should be uniform in dimension.

4. Staircase shown is for a 'minimum' situation where the ambulant disabled are the critical criteria and the traffic flow is low; where greater traffic flows and mattress evacuation have to be catered for, a wider staircase may be required.

5. See also handrail data sheet.

6. See Building Regulations approved documents K.M. Minimum clear landing depth must in all cases be not less than minimum clear stair width. Landing may require to be deeper e.g. to facilitate turning for mattress evacuation.

7. White edging on steps will make them more visable to the partially sighted.

Activities:
Entering crawlway through access hatch and taking up crawling posture.

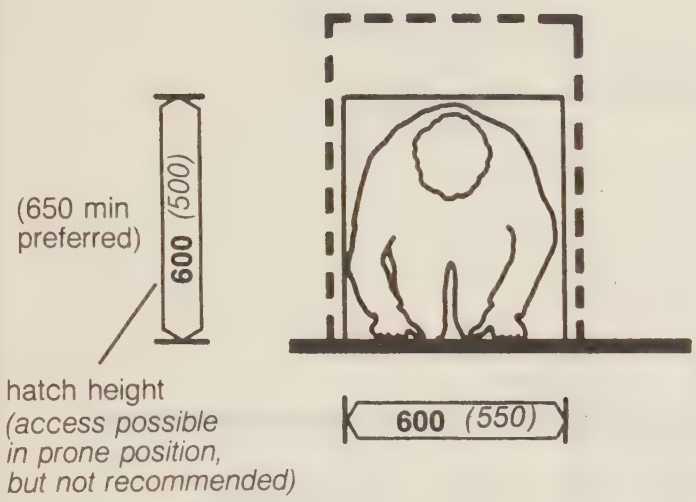
DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale

Service ducts

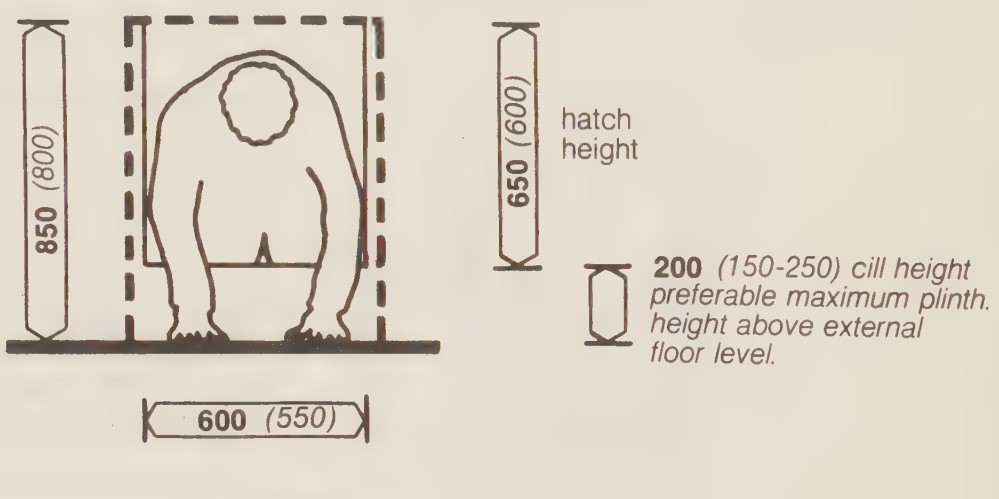
HORIZONTAL CRAWLWAYS (1)
— ACCESS HATCHES

Users:
Service Engineers

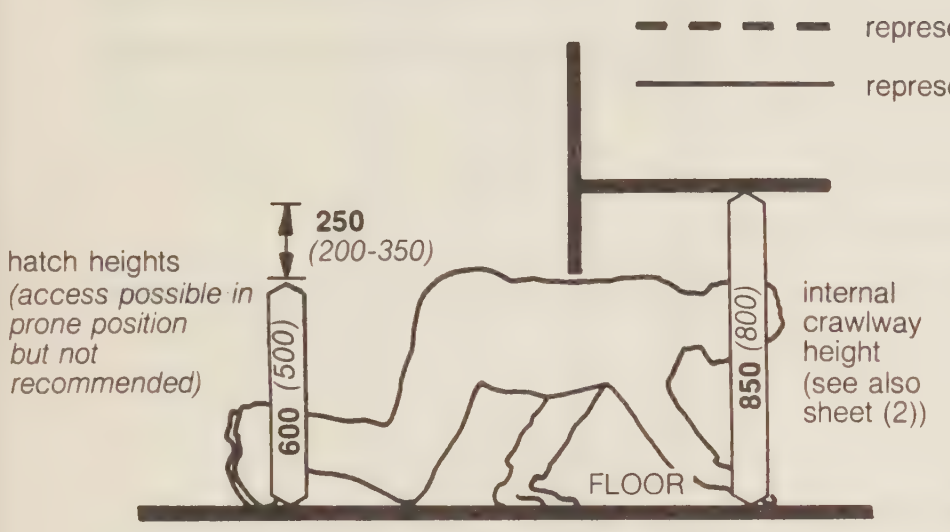
(A) ACCESS AT FLOOR LEVEL



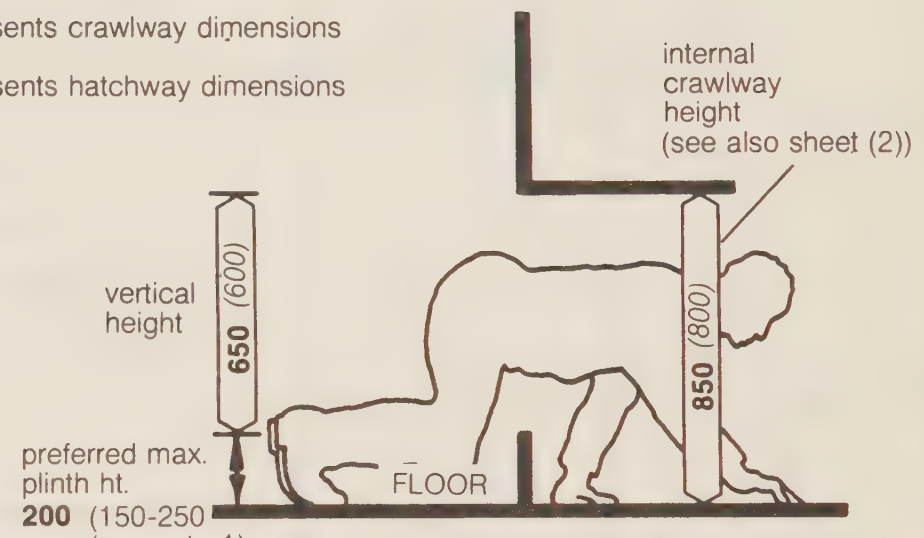
(B) ACCESS OVER PLINTH AT FLOOR LEVEL


850 (800)
650 (600)
hatch height
200 (150-250) cill height preferable maximum plinth. height above external floor level.
600 (550)

ELEVATION



ELEVATION



SECTION

SECTION

(C) OPTIMUM LOCATION FOR CONVENIENT CRAWLWAY ACCESS

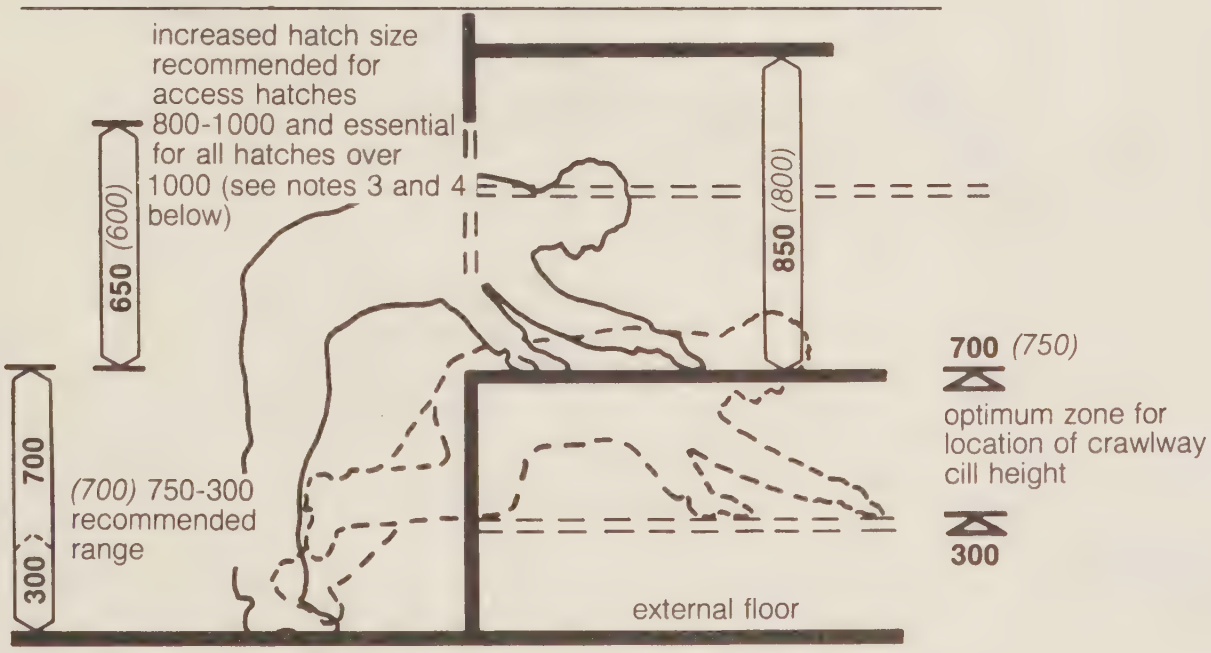

increased hatch size recommended for access hatches 800-1000 and essential for all hatches over 1000 (see notes 3 and 4 below)
650 (600)
850 (800)
700 (750)
optimum zone for location of crawlway cill height
300
700
(700) 750-300 recommended range
external floor

Fig.19

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:
1. These dimensions apply to crawlway access panels situated at or near floor level. If at all possible the bottom of the hatchway should be flush with the crawlway floor.

2. Where the crawlway floor is 300mm or more above the external floor level, the hatch should not have a plinth (see also note 3 below).

3. For optimum access, the floor of the crawlway should be between 300 and 700mm above the external floor level. Above 700mm, aids such as steps outside and handles inside the crawlway may be necessary.

4. If the access to the hatch is by ladder or some other aid, dimensions must be increased to allow for the extra difficulty in entering the crawlway. A minimum height of 800 *(750)* is recommended with hatch width also increased to 750 *(700)* to grip handles inside hatch safely.

5. Circular hatches should be at least 650 *(600* - restricted) in diameter; 800 **(750)** if approach is by ladder.

6. See also HORIZONTAL CRAWLWAYS.

Activities:
Crawling through crawlway containing no services (pipes etc), in order to reach section with services requiring maintainance, replacement, or repair. No working space provided. Users may be carrying tools.

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale

Service Ducts

HORIZONTAL CRAWLWAYS (2)

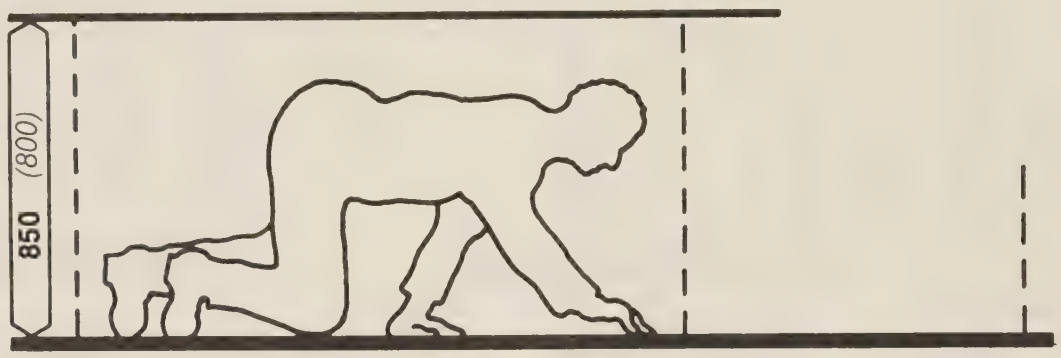
Users:
Service Engineers

(A) STRAIGHT MOVEMENTS

crawlway width

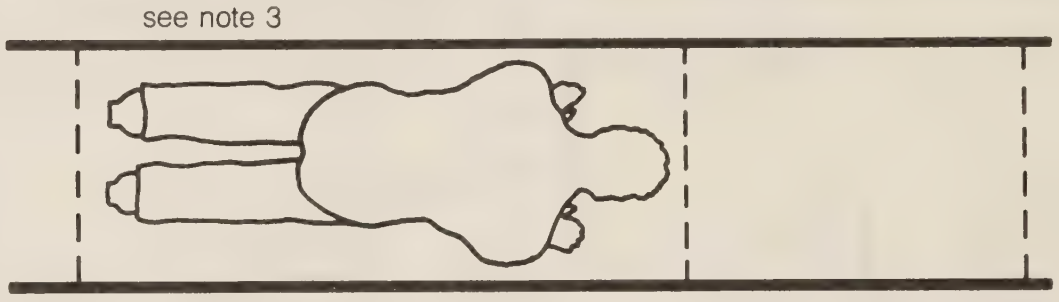
650 *(600)**

* access is just possible (but is very restricted) in 550. It is not recommended as excessive damage to clothing will occur.

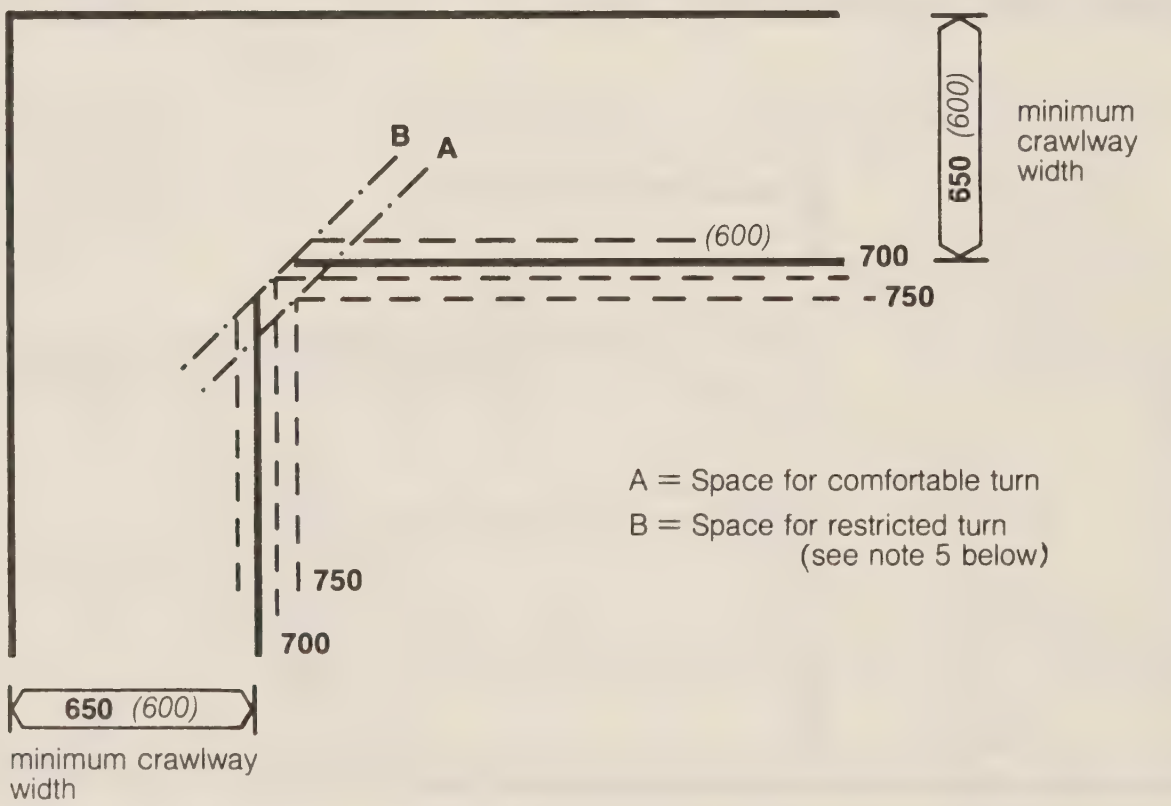


1600 *(1500)* longitudual space to allow movement see note 3

2500 *(2450)* to accommodate prone posture



(B) 90⁰ BEND IN ACCESS CRAWLWAY



A = Space for comfortable turn

B = Space for restricted turn (see note 5 below)

Fig.20

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. Width or height may need to be increased where equipment carried is large or heavy, or significantly change the requirements of the user in certain dimensions (e.g. if a back pack is used clear height needed may be greater).

2. Additionally, the dimensional requirements of crawlways will also depend upon the type of servicing activities to be accommodated including repair and replacement, as well as routine maintainance.

3. A height of 850 allows the head to be tilted upwards, and also accommodate the wearing of protective headgear.

4. Generally, the length dimension will not need to be taken into consideration as most crawlways are of sufficient length to make this value unimportant. However, it is preferable to have this full length available immediately inside an access hatch, and if turning through 180° in a crawlway, this minimum length if necessary. Turning spaces should be at least 1350 *(1200)* wide.

5. Chamfered corners will be necessary to allow comfortable turning in all crawlways less than 750 wide, or restricted turning in all crawlways less than 700 wide.

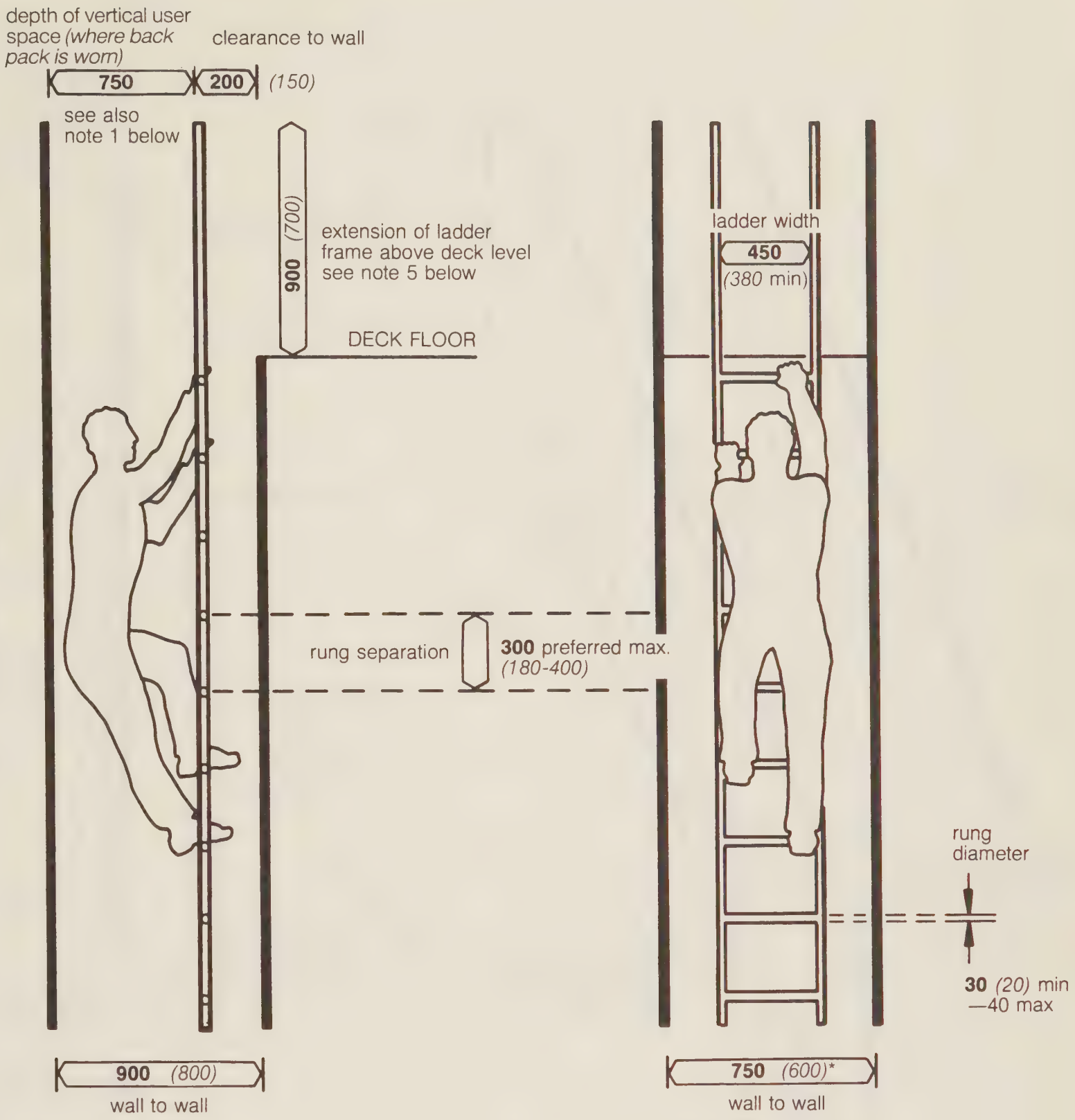
Activities:
Climbing up a vertical ladder, possibly wearing a backpack containing tools, in order to reach a platform where services are situated.

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale

Service ducts

VERTICAL ACCESS SHAFT WITH LADDER

Users:
Service engineers



* *restricted width - it is not recommended that any vertical shafts should be less than 650 wide).*

Fig.21

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. Ladder and width dimensions refer to ladders which are at angles of between 90° and 75° to the horizontal. USER SPACE MUST BE INCREASED BY 150 *(100)* FOR EVERY 5° OF DISPLACEMENT FROM THE VERTICAL.

2. Ladders should not be higher than 6100 for reasons of safety. If a duct is higher than this, back guards must be provided. Landing platforms should be provided at regular intervals in long ducts and it is advisable to provide fittings on the platform to which safety harnesses can be attached. In work situations it is a requirement that such fittings also be available on the side of the ducts at 2m intervals (BSI-CP 413 (1961)).

3. Interior of duct should be regular in shape and sudden changes in shape must be avoided.

4. In order for the user to be able to stand up or squat, or attain a stooping posture (as considered necessary) having passed through an access hatchway, there must be a space of at least 1100 *(900)* x 700 x 1900, or 900 *(800)* x 700 x 1200, or 1100 *(900)* x 700 x 900 (length x width x height respectively), (with no obstructions in the space) available at intermediate platform levels.

5. The extention of the ladder frame above the deck level provides a handrail which enables the user to climb up onto the deck or platform more easily. It may also be used as a handhold or support if the user needs to do work on services or structures on the back wall of the duct at that level.

6. See also HORIZONTAL CRAWLWAYS (1) For details of vertical hatch access from ladders.

7. Ladders over 55° pitch must comply with H.S.W. act.

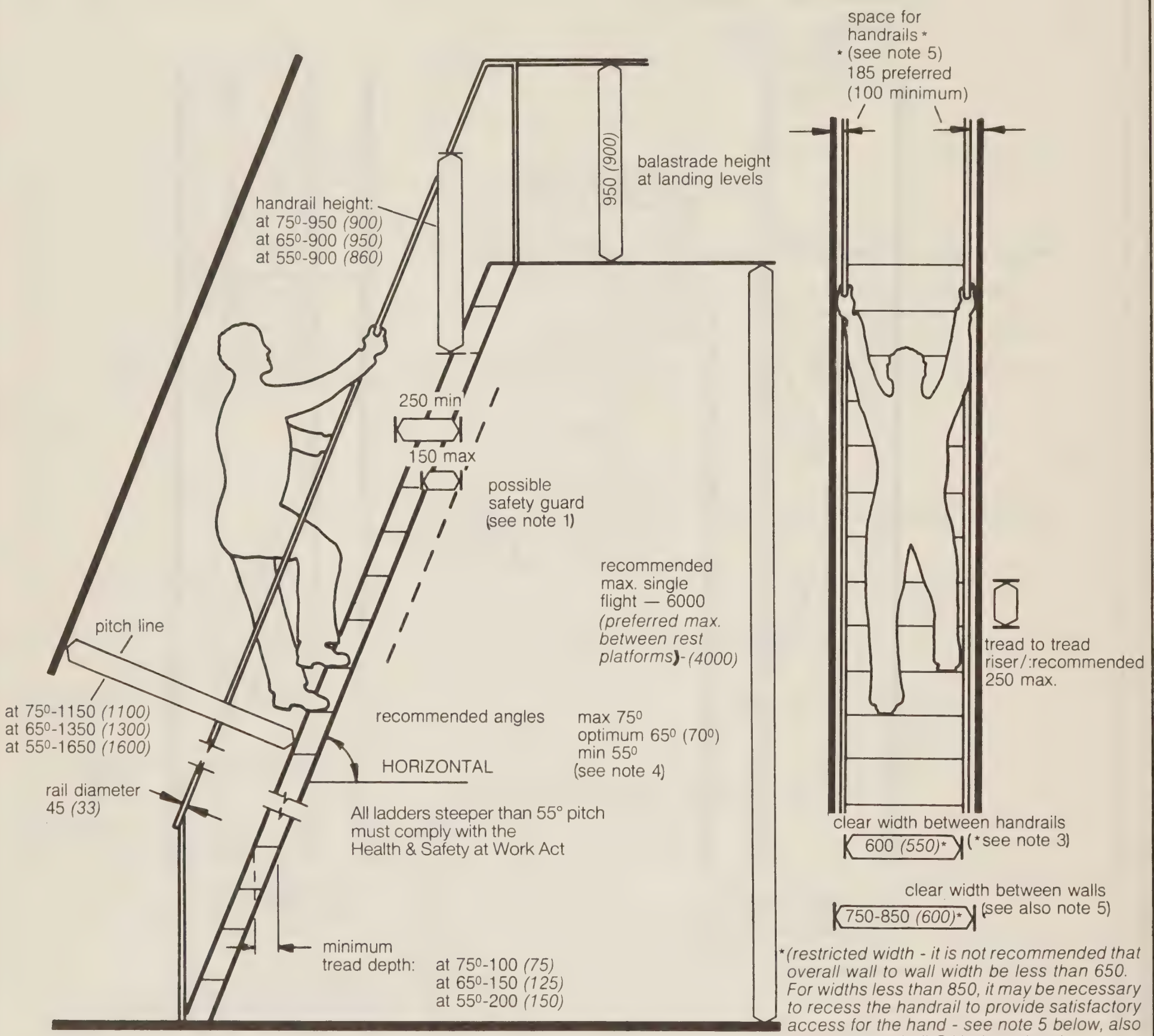
Activities:
Climbing up or down a step ladder inclined at and angle of between 75⁰ and 50⁰ including carrying tools and equipment in order to reach services requiring maintenance, repair or replacement.

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale

Service Ducts

STEP LADDERS, AT ANGLES BETWEEN 75⁰-50⁰ TO HORIZONTAL

Users:
Service engineers



(restricted width - it is not recommended that overall wall to wall width be less than 650. For widths less than 850, it may be necessary to recess the handrail to provide satisfactory access for the hand - see note 5 below, also separate handrail C.U. data sheet)

Fig.22

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:
1. Safety guards behind the steps of the ladder may be needed in order to prevent accidents where feet may slip between the steps. Such a guard should be situated 150mm max. from the back edge of the steps, running parallel to them, but in no case should there be less space than 250 between the front edge of the step and any obstruction to foot penetration.

2. There should be a clearance of at least 2100 *(2000)* from ceiling to floor in the area in which the ladder begins and the man gains access to the ladder.

3. Absolute min. 530, is not recommended in positions where carrying equipment or tools is essentially involved.

4. Below 55° design should preferably be as for stairs (see STAIRS CUD sheet). Ladders at or below 55° tend to be more hazardous to use, encouraging the most dangerous frontal approach during descent.

5. Space to grip the rail safely is essential - ie 75 absolute minimum between rail and wall. This requirement may well increase the minimum wall to wall width recommendations given above (eg a step ladder 600 wide, with 45mm diameter handrails requires a clear overall width of 850 to access the handrails).

Activities:
Climbing through a hatch situated in the floor or ceiling. Hatch may have a ladder situated in a vertical service duct leading up to it, and user may have to use his/her strength to pull himself/herself up, or lower himself/herself down through the hatch.

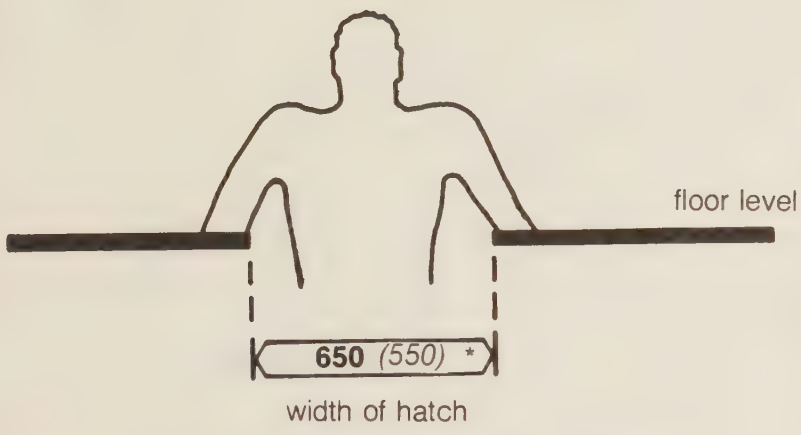
DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale

Service ducts

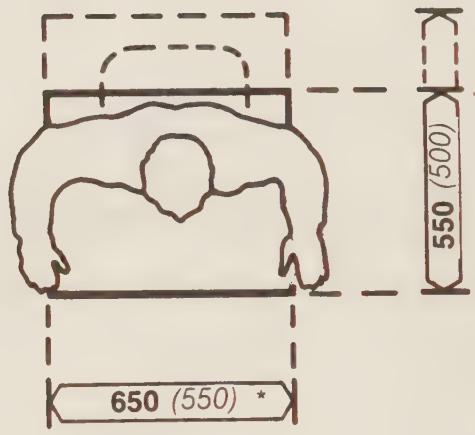
HORIZONTAL (FLOOR/CEILING) HATCHES

Users:
Service engineers

(A) RECTANGULAR HATCHES



* *(restricted width - all floor or ceiling hatches should preferably not be less than 600 wide).*(See also note 3 below.)



(B) CIRCULAR HATCHES

diameter of hatch
(restricted diameter - not recommended for frequently accessed areas where outdoor or protecting clothing is worn.)

Fig.23

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:
1. Adequate support for the users feet (foothold or ladder) is essential in order to assist passage through the hatch. (If no support is provided, then too much depends upon the arm strength of the user. Such a position is potentially hazardous and should be avoided).

2. Ladders or foot/hand holds should extend up to floor level, or where possible extended to 1200/900 *(700)* above floor level (see also VERTICAL ACCESS SHAFT WITH LADDER data sheet) where hatch is adjacent to vertical support.

3. It is also important the hatch should not be made too wide because a small user would have difficulty in assisting himself up or down with his/her hands or forearms.

Activities:
Walking across a suspended catwalk between buildings in order to reach another rooftop or building.

DHSS **Ergonomic data bank**
Activity space example layout, not to scale

Service ducts
CATWALK

Users:
Service engineers

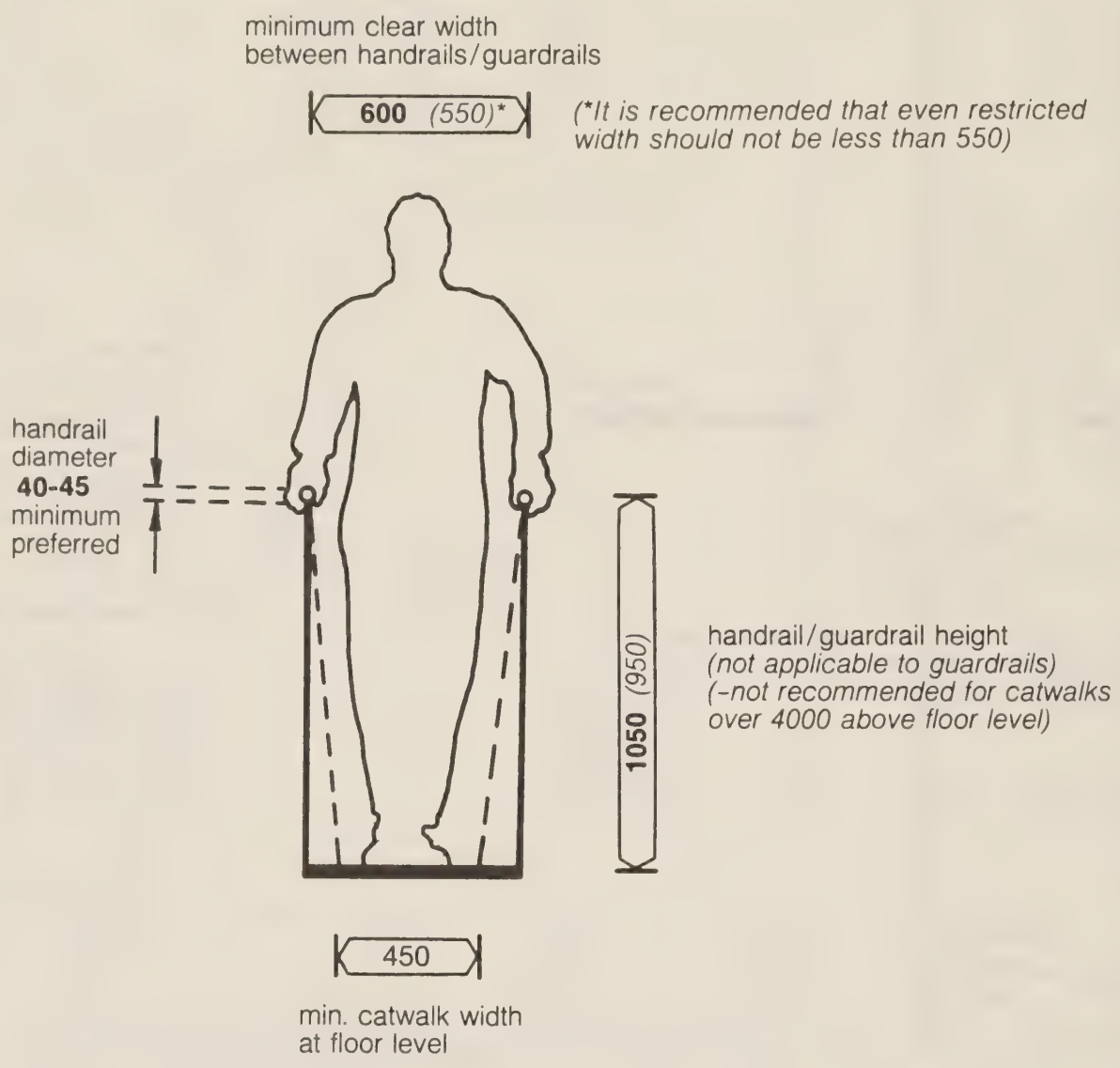


Fig.24

1350 * *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:
1. If the catwalk is long, it is advisable to make the catwalk wider than the minimum width shown above, this will reduce the user experiencing vertigo or other spatial discomfort.

2. Regularly spaced balusters or vertical supports give the impression that the catwalk is more enclosed and therefore psychologically 'safer to use'. No specific dimensional recommendation is made, but intervals greater than 300 (centre to centre) will appear potentially and distressingly hazardous to some users.

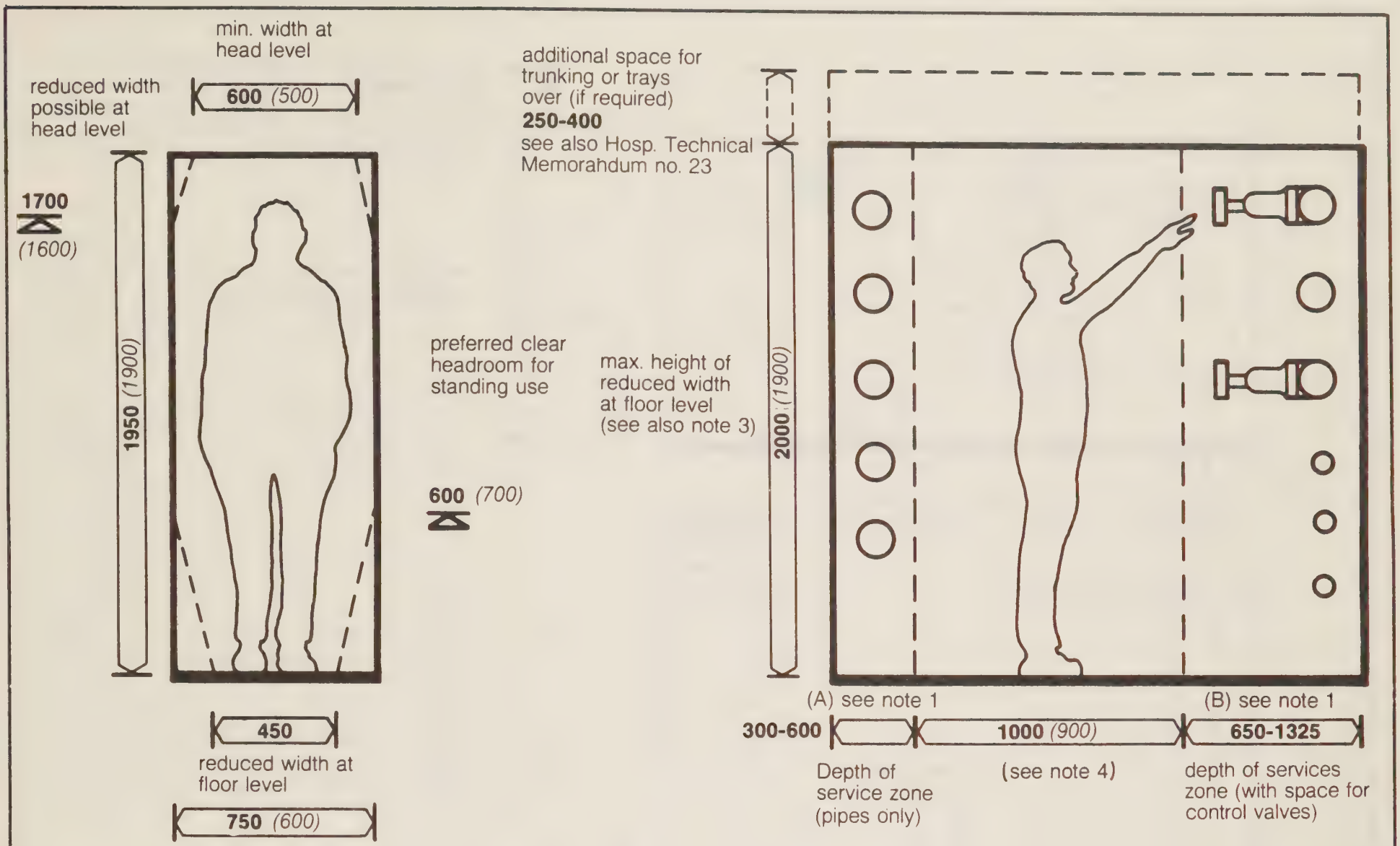
Activities:
(a) Walking through a walkway without services, perhaps carrying tools, in order to reach walkway, or crawlway, or vertical ducts where services are situated.
(b) Carrying out work such as replacement, repair, and maintenance on services situated on one or both sides of the walkway.

DHSS **Ergonomic data bank:**
Component-user data sheet, not to scale

Service ducts

HORIZONTAL WALKWAY WITH OR WITHOUT SERVICES (ie No working space)

Users:
Service engineers

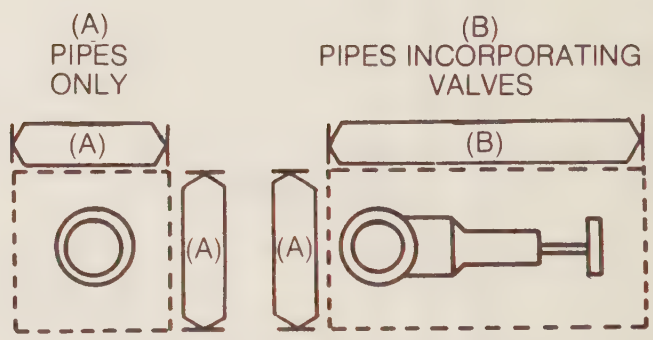


Pipe diameters (see note 1)

Pipe Dia.	Dimension (A) (mm.)						Dimension B (mm.)		
mm.	Welded or Screwed		Flanged		C.I.		Gas	Water	Steam
	I	U	I	U	I	U			
80	350	300	350	350	350	300	475	600	650
100	375	325	400	375	375	325	550	700	800
150	475	425	475	425	450	400	700	800	950
225	600	–	600	550	550	475	750	1050	1325

SPACE ALLOCATION FOR

I = INSULATED
U = UNINSULATED



For future information on space allowances for service zones please refer to DHSS Hospital Technical Memorandum No. 23.

Fig.25

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:
1. Service zone space requirements should be related to the largest insulated or uninsulated pipe or other service element to be accommodated. Some examples, related to pipe diameter, are given in the above table:

2. Wherever possible, walkways should be of uniform width over the whole of their height, but where absolutely necessary, a reduction in cross sectional space may be possible in the upper and lower sections shown above.

3. Sideways movement is possible in less than 600, but full width must be maintained over the full height of the passage. The crab like movement requires a width of 550 *(500)*, and it is recommended that this length of passageways (or restricted lengths of wider, longer passageways) should not significantly exceed 2500 in length.

4. The maximum reach without excessive strain of the 25th percentile man (shod) is 1850mm. It is therefore advisable to situate the highest pipe or valve etc., below this height, and it is generally recommended that pipes and valves which are most likely to require attention (repair, replacement, maintainance etc), should be situated within the zone 800 to 1750mm above floor level. Where services are restricted to within this zone only reduced access space of 800 *(600)* may be adequate.

5. Access to cleaning eyes should be provided. Consideration must however be given to the space required to take in or take out equipment during installation, replacement, maintainance or repair. The space required may be greater than the normal workspace requirement shown here.

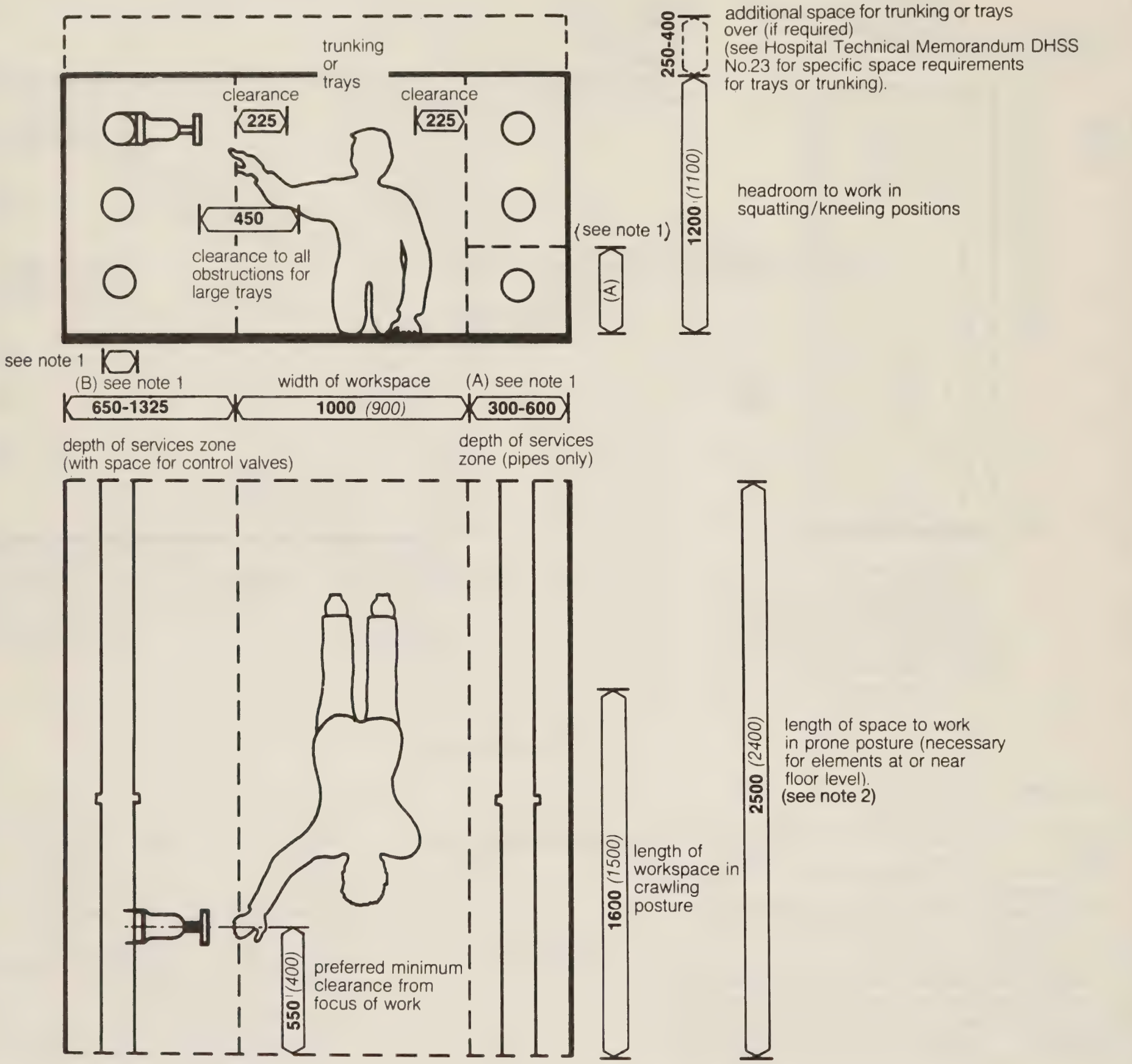
Activities:
Carrying out installation, replacement, repair and maintenance work on services situated at the sides of (or above) crawlway).

DHSS **Ergonomic data bank**
Component-user data sheet, not to scale

Service ducts

HORIZONTAL CRAWLWAYS WITH SERVICES

Users:
Service engineers

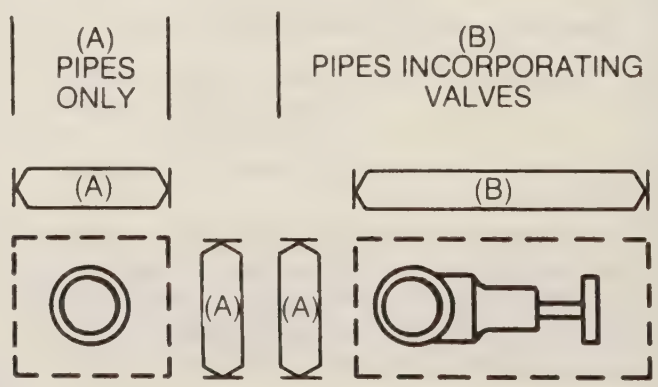

trunking or trays
clearance
225
clearance
225
450
clearance to all obstructions for large trays
250-400
additional space for trunking or trays over (if required) (see Hospital Technical Memorandum DHSS No.23 for specific space requirements for trays or trunking).
(see note 1)
(A)
1200 (1100)
headroom to work in squatting/kneeling positions
see note 1
(B) see note 1
width of workspace
(A) see note 1
650-1325
1000 (900)
300-600
depth of services zone (with space for control valves)
depth of services zone (pipes only)
1600 (1500)
length of workspace in crawling posture
2500 (2400)
length of space to work in prone posture (necessary for elements at or near floor level). (see note 2)
550 (400)
preferred minimum clearance from focus of work

Pipe diameters (see note 1)

Pipe Dia.	Dimension (A) (mm.)						Dimension (B) (mm.)		
mm.	Welded or Screwed		Flanged		C.I.		Gas	Water	Steam
	I	U	I	U	I	U			
80	350	300	350	350	350	300	475	600	650
100	375	325	400	375	375	325	550	700	800
150	475	425	475	425	450	400	700	800	950
225	600	—	600	550	550	475	750	1050	1325

I= INSULATED
U = UNINSULATED

SPACE ALLOCATION FOR



For future information on space allowances for service zones please refer to DHSS Hospital Technical Memorandum No.23.

Fig.26

Service Ducts

HORIZONTAL CRAWLWAYS
WITH SERVICES

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. Service zone space requirements must be related to the largest insulated or uninsulated pipe or other service element to be accommodated. Some examples, related to pipe diameter, are given in the table.

2. As crawlways are normally greater in length than 2500, workspace length is rarely a critical consideration, but if servicing work needs to be undertaken at low levels, space to work in a prone position may be required. Space to attain a comfortable crawling posture is always essential.

3. Access should be provided at each end of the crawlway. Access should be provided at intervals by means of doors or covers (see ACCESS HATCHES data sheet). They may need to be large enough and suitably placed to enable long lengths of pipe to be taken in or removed easily (ie. without damaging equipment or building fabric). Where discharge and ventilating pipes are accommodated in crawlways, access to cleaning eyes must be provided, and the crawlways themselves must be ventilated to provide fresh air and prevent excessive build up of ambient temperature.

Fig.27

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Index of Subject Headings

(Headings in bold type indicate main section headings).

	Para
Bed-passenger lift	2.2
Capricode	1.10
Circulation space	2.1
Cleaning and maintenance	2.36
Communications	2.1
Cost allowances	1.9
Damage	2.37
Description of Terms Used	2.1&2.2
Design and Environmental Considerations	2.27
Disabled people	2.22
Economy	2.3
Electrical Installation	3.15
Emergency Electrical Supplies and Lighting	3.25
Engineering Services	**3**
Ergonomic Data	1.8
Exclusions	1.6
Finishes	2.33
Fire Precautions	2.17
Flooring	2.40
General Functional and Design Requirements	**2**
Goods lift	2.2
Heating	3.9
Hydraulic lift	2.2
Lifts	**4**
Lifts and Stairways: types of	2.2
Lighting	3.20
Machine room	2.2
Noise	3.8
Safety	3.4
Scope of Health Building Note	**1**
Service lift	2.2
Signposting	2.16
Stairways	2.26
Statutory and other requirements	2.24
Traction-driven lift	2.2
Ventilation	3.12
Vertically Routed Engineering Services	3.1
Works Guidance Index	1.11
Well	2.2

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